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A TEXT-BOOK

OF

OBSTETRICAL NURSING

BY

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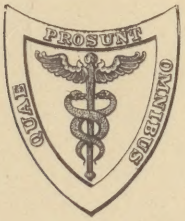

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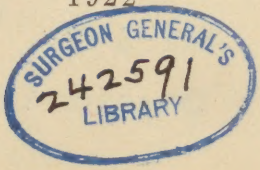

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TO

ALL THE NURSES WHO HAVE WORKED WITH ME

FOR THE WELFARE OF OUR PATIENTS IN THE MATERNITY

OF THE WOMAN'S MEDICAL COLLEGE OF PENNSYLVANIA

THIS BOOK IS DEDICATED

AS AN EXPRESSION OF MY SINCERE APPRECIATION

PREFACE.

This book is the outcome of several years' teaching of the nurses in the Hospital of the Woman's Medical College of Pennsylvania. I have intentionally given considerable space to the discussion of the general subject of obstetrics, because I have found from the questions of my classes that it was of interest and of value to them as a background for the more practical part of their training. I hope that I have also placed enough emphasis on the human side of obstetrical nursing to convince any nurse who may read this book that here as in all her professional work the watch-word is service.

A. W. T.

Philadelphia, 1922.

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OBSTETRICAL NURSING.

CHAPTER I.

OBSTETRICS.

Obstetrics is the art of assisting women in childbirth, according to the usual definition, but the obstetrical care of a patient really concerns itself with the three parts of the process: pregnancy, labor and the puerperium.

Pregnancy covers the period of the growth of the child in the uterus from its beginning, and normally lasts about two hundred and eighty days. A woman who is pregnant for the first time is called a primipara or primigravida; one who has passed through one or more pregnancies is a multipara. These terms are often abbreviated to i-para and x-para.

Labor or parturition is the process by which the child is expelled from the uterus. Its duration is usually several hours, but varies according to conditions which will be detailed later. The term parturient is sometimes used to denote a woman in labor.

The puerperium is the period after the birth of the child, during which the woman's whole system is resuming its normal condition, after the changes incident to pregnancy and labor. Puerpera is the technical term applied to the patient during this period.

Obstetrical Nursing.—In the average case the nurse's services are desired for the labor and two to four weeks of the puerperium. She is not needed during pregnancy unless complications arise, although many women prefer to have the nurse in attendance during the last few days, rather than to wait for the onset of labor before calling her. If the patient is to be confined in a private house, she will probably wish the nurse to make a visit or two, to help her in planning the necessary arrangements and getting together the supplies.

The nurse who is connected with a modern obstetrical clinic or out-patient service will find that much of her work has to do with the prenatal care of expectant mothers. Not only will she see them as they come to the clinic for examination but she will probably be called upon to visit them in their homes and give them instructions as to their mode of living and the preparations for the advent of the baby. After the birth of the child there will be not only the care of mother and baby during the puerperium but also the follow-up work involved in a postnatal clinic, in which both are kept under observation, with especial attention to the care and feeding of the child until it has passed the dangerous first months of life in which so many infants slip away for want of proper supervision.

The obstetrical nurse, trained in a hospital and accustomed to its routine, finds entirely new problems to face when she takes up private nursing. The hospital supplies and appliances which she has come to look upon as a matter of course, do not exist in the home, and she must exercise forethought and ingenuity in providing substitutes. The patient is no longer one of a large number, an incident in the day's work, but the center of attention in the family, to whom no detail of her comfort is too small to be of importance. The nurse's

position is one which requires special judgment and tact in her dealings with the family, and she comes of necessity into particularly intimate relation with her patient.

Obstetrical work is too often looked upon as an uninteresting routine, exacting in its hours and not demanding the display of the highest skill. The nurse who undertakes it will find, however, that the greatest responsibility is laid upon her, for on her ability to meet an emergency with skill and prompt action will depend not one life alone but two. Even though the case be "only a normal one," she has the opportunity to illustrate the true meaning of the word obstetrics in standing by her patient in her hour of need. And truly "to stand helpfully by a soul on earth whose body is in pain . . . is one of the highest privileges as well as the most sacred duty."[1]

OBSTETRICAL ANATOMY AND PHYSIOLOGY.

Pelvis.—The pelvis is the bony girdle of the lower part of the trunk, and has in general the function of supporting the body-weight and transmitting it to the lower limbs. It has also a special obstetrical importance, because in it lie the reproductive organs of the woman and through its cavity the child passes at the time of birth.

The pelvis consists of four bones: the sacrum, the coccyx and the two hip bones. It has also three joints: the symphysis pubis, where the hip bones meet anteriorly, and the two sacro-iliac articulations or synchrondroses, where they meet the sacrum. There is so little movement at these points that it is hard to think of them as actual joints, but at least they prevent the pelvis from being an absolutely

[1] Worcester: Nurses for our Neighbors.

rigid bony ring, especially during pregnancy, when the softening of the tissues and the more abundant blood supply allow a slight increase in the amount of motion.

The entrance to the pelvis from above is called the inlet or superior strait, and the opening below, bounded on each side by the ischial tuberosities, the outlet or inferior strait. The cavity is narrower below than above, as the distance

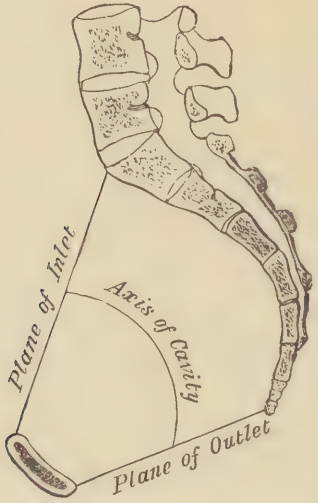

FIG. 1.—Median sagittal section of pelvis. (Gray.)

between the tuberosities is only 11 cm., while the widest measurement of the inlet, from side to side, is 13.5 cm. (a difference of about one inch). In other words, the pelvis is slightly funnel-shaped. This shape is more marked in an infant. Since the sacrum and coccyx, forming the posterior wall of the pelvis, have a length of about 10 to 11 cm., while the symphysis, forming the anterior wall, is on the average only about 4 cm. deep, it is easy to see that the pelvis is much

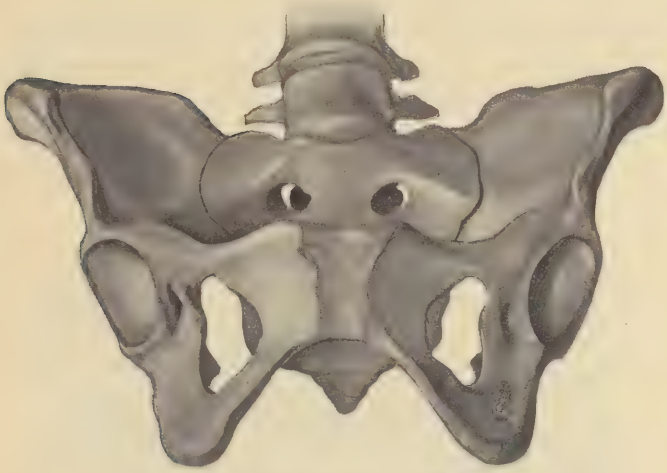

FIG. 2.—Female pelvis. (Cragin.)

FIG. 3.—Male pelvis. (Cragin.)

deeper posteriorly than anteriorly. This fact affects somewhat the way in which the child passes out of the pelvis.

There are various anatomical differences between the pelvis of a man and that of a woman. The most important of these are as follows:

1. The woman's pelvis is wider above.
2. Its cavity is shallower.
3. Its outlet is wider.

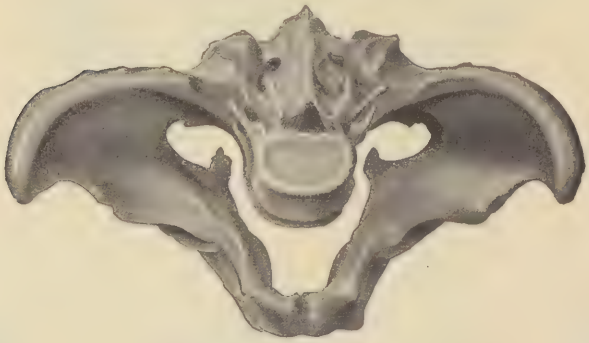

FIG. 4.—Pseudo-osteomalacic pelvis. (Naegele.)

These differences all show that the female pelvis is more adapted for child-bearing, since the child can more easily enter a wide inlet, pass through a short canal and emerge from a wide outlet. In some cases in which a woman's pelvis is more like the male type, or those in which through lack of development it still keeps the shape of the child's pelvis, labor is bound to be more difficult. If a child or a young girl does much hard work, especially heavy lifting, while the bones are still comparatively soft, various changes in the shape and size of the pelvis may be brought about, which will also add to the difficulties of childbirth. Similar results are seen when lack of nourishment has prevented

proper development of the bones. The softening of the bones due to rickets, a common disease of children, or osteomalacia, an adult disease very uncommon in this country, may be a cause of very serious deformities. Hip disease, lameness and spinal curvature may also distort the shape, making the pelvis irregular or asymmetrical.

FIG. 5.—Osteomalacic pelvis. (Bumm.)

Muscles.—The muscles of the pelvis serve in part as a soft pad or lining, which protects the child from injury by the hard bony surface. Others, especially the levator ani, go to make up the so-called floor of the pelvis, and still others enter into the formation of the perineum.

Reproductive Organs.—The female reproductive organs are classified as internal and external organs. The vagina, which makes a passage for the child from the uterus to the outside world, will be described under the first heading.

External Organs.—*Mons Veneris.*—The mons Veneris is a pad of fatty tissue, covered with skin and hairs, which lies over the symphysis.

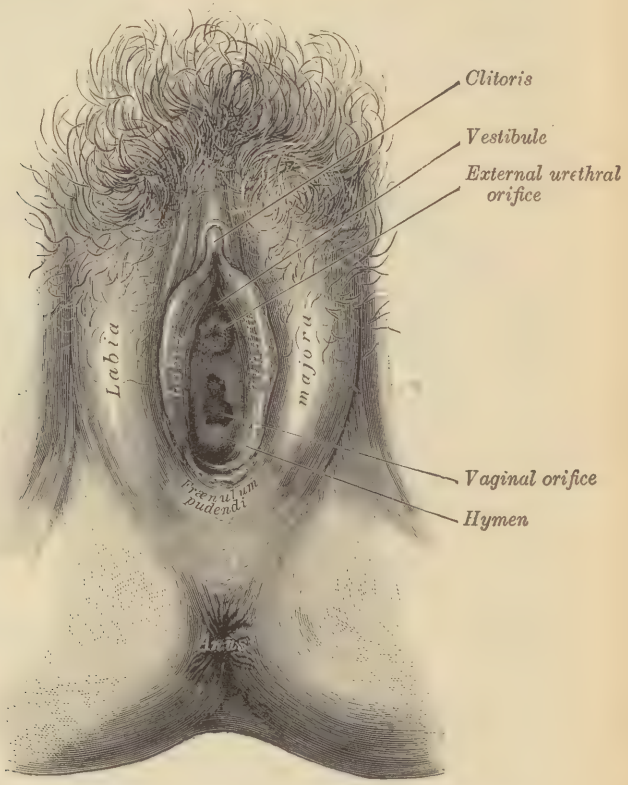

FIG. 6.—External genital organs of female. The labia minora have been drawn apart. (Gray.)

Vulva,—The vulva is the name given to the external structures lying posterior to the mons Veneris. First among these are the labia majora, two folds of skin which run backward on either side from the mons to the perineum.

The pubic hairs of the mons are continued down over their outer surfaces. Beneath the skin there is fatty and connective tissue and also an abundant plexus of veins, which not infrequently become large and varicose during pregnancy and may even rupture with the strain of labor.

Labia Minora.—The labia minora are smaller folds of skin, which lie to the inner side of the labia majora and parallel to them, often quite hidden between them. They join anteriorly and spread apart posteriorly, leaving a somewhat triangular or almond-shaped space between them.

Clitoris.—At the junction of the labia minora, which form its prepuce, is a small, sensitive structure called the clitoris. Its tip or glans, which is about the size of a small pea, protrudes from between the folds of the labia.

Vestibule.—The vestibule is the triangular area enclosed by the labia minora. In it are found the openings of the urethra and vagina, and at either side of the vaginal orifice, the ducts of the vestibular glands of Bartholin.

Bartholin's Glands.—These glands, located just outside the vagina, empty a slight secretion which helps to keep the parts moist. In case of infection, especially by the gonococcus, abscesses may form in them, and after the infection has apparently disappeared, the organisms may still remain hidden deep in the glands, waiting their chance to make further trouble.

Vagina and Hymen.—The vagina serves as the canal of entrance to the uterus and also as a passage through which any cast-off material from the uterus, like the menstrual discharge, can make its way out. During labor it forms a canal inside the bony pelvis, through which the child is born.

The entrance to the vagina is encircled by a fold of skin and mucous membrane, the *hymen*. The opening thus left is usually so small that unless the hymen happens to be

FIG. 7.—The crescentic hymen. (Cragin.)

FIG. 8.—The annular hymen. (Cragin.)

extremely soft and elastic, it is ruptured at the first sexual intercourse. During childbirth the edges are still farther stretched and torn, so that there remain afterward but a few tags of tissue, the *carunculæ myrtiformes*.

The vagina itself is a canal into which the lower end of the uterus dips. It is somewhat curved, with its longer wall posteriorly, like the pelvis, and its length is from 6 to

FIG. 9.—Carunculæ myrtiformes. (Cragin.)

10 cm. ($2\frac{1}{2}$ to 4 inches). When the woman is lying on her back, the direction of the vagina is not horizontal but obliquely downward. These facts have a very practical bearing and should be kept in mind during such procedures as a vaginal examination, the introduction of a speculum or the giving of a douche. It is also important to remember the position of the vagina in the pelvis, with the urethra and bladder lying in front of it and the rectum behind, since this

explains how its canal may be obstructed by pressure from a full bladder or rectum.

The vaginal wall consists of muscle and connective tissue, including many elastic fibers, and has a lining of mucous

FIG. 10.—Internal genital organs, with bladder, urethra and rectum, seen from the side. (Bacon.)

membrane, containing many layers of flattened epithelial cells, something like the skin. The anterior and posterior walls lie in loose folds which seem almost to close the opening, but they are easily stretched apart, so that the canal which seemed barely large enough to admit the examining

finger can make room for an eight- or ten-pound baby with little difficulty.

There are no glands in the vagina, but a so-called secretion of white, curd-like material is present, especially during pregnancy. Although the studies of different investigators show varying results, it is probable that this acts as a protection by destroying or at least rendering harmless any pus organisms which may enter the vagina during pregnancy. Unfortunately it has no effect on the gonococcus.

Internal Organs.— *Uterus.*—The uterus is sometimes called the organ of menstruation, but its more special obstetrical functions are to hold and nourish the fetus during pregnancy and to expel it after labor sets in. It is a somewhat pear-shaped organ, barely three inches long, which lies in the pelvis, in front of the rectum and behind the bladder, against which it tips forward, when in the normal position. It is so movable that its position is easily changed by pressure from the surrounding organs, especially when it is heavy or congested. Except for its lower end, the cervix, which dips down into the vagina, the uterus is covered with a part of the peritoneum which lines the abdominal cavity. Its walls are made of strong smooth muscle fibers, which grow tremendously during pregnancy and set up powerful contractions during labor. Its cavity is lined by mucous membrane or endometrium, in which lie quantities of glands. The cells of the endometrium are provided with cilia, fine hair-like processes, which by their motion create a current downward toward the vagina.

The uterus is usually described as consisting of two parts, the body and the neck or cervix. The body may be further divided into two parts: the upper segment or fundus, which has especially thick muscular walls, and the lower segment,

whose walls contain more connective tissue and are therefore more easily stretched.

The cervix is really a narrow canal, about an inch long, with an opening at each end; the internal os passing into the cavity of the uterus above, and the external os into the vagina below. In a woman who has not borne children it is a round or oval opening, too small to admit more than

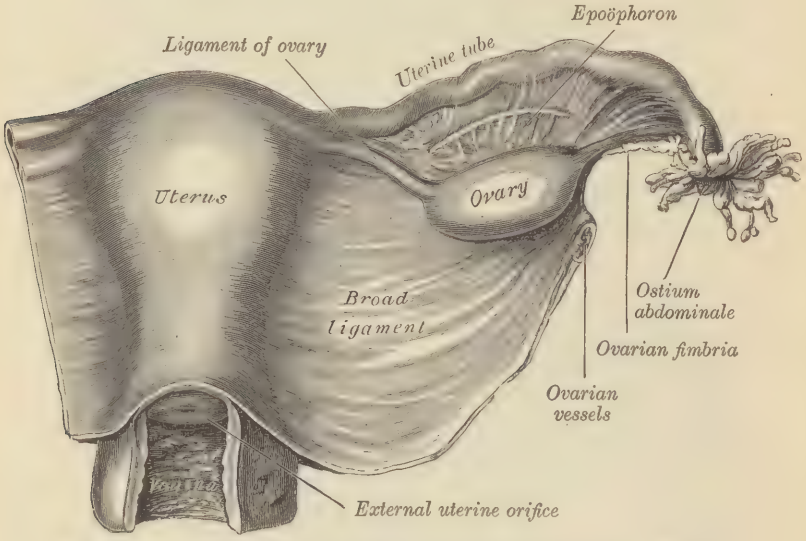

Fig. 11.—Uterus and right broad ligament, seen from behind. The broad ligament has been spread out and the ovary drawn downward. (Gray.)

a finger-tip, but in the course of labor the canal is stretched wide open to let the child pass through. It is often slightly torn at childbirth, and afterward looks like a transverse slit. The os is usually filled with the mucus secreted by the cervical glands, which is particularly thick and abundant during pregnancy. Besides this opening below, through the cervix into the vagina, the uterus has two others above, into the

uterine or Fallopian tubes, which branch off from each side of the fundus.

The uterus has three pairs of ligaments: the broad ligaments, folds of peritoneum which pass from the sides of the uterus toward the pelvic walls; the round ligaments, thin muscular cords running forward to the inguinal canals; and the utero-sacral ligaments, extending backward on either side of the rectum to the sacrum. These all help to keep the uterus in position, but they may become so stretched in pregnancy from the strain of the heavy uterus that they no longer succeed in holding it in its proper place.

The blood supply of the uterus comes from the uterine and ovarian arteries, which run along its lateral edges, sending branches across its anterior and posterior surfaces, and forming a complicated network. Its nerves come from the sympathetic nervous system.

Fallopian Tubes.—The Fallopian tubes are about four or five inches long and run in the folds of the broad ligament toward the sides of the pelvis. They are also called the oviducts because they are the ducts which carry the ova or eggs from the ovaries to the uterus. The uterine end of the tube is so narrow that it will barely admit a fine probe, but the farther end, or fimbriated extremity, is a little wider and shaped somewhat like a funnel or trumpet. Like the uterus, the tubes are covered by peritoneum and lined with mucous membrane, and their walls are composed of smooth muscle. The cells of the mucous membrane are furnished with cilia which set up a current down toward the uterus and thus suck in the ovum when it has been cast out from the ovary, and send it toward the uterine cavity.

Ovaries and Ovulation.—The ovaries lie behind the tubes, attached to the broad ligaments, but not between their folds. They are about one and a half inches long and almond-

shaped, and are largely made up of a firm connective tissue called stroma, in which are crowded thousands of tiny ova, each surrounded by a thin capsule. An ovum is simply a single round cell, too small to be seen without a microscope. With its capsule it is called a Graafian follicle. Although the ova are present at birth, it is not until the age of puberty that they are discharged regularly from the ovary, to be carried into the uterus by the tubes. This process, *ovulation*, occurs every four weeks during the sexual life of a woman.

Before the ovum can break through the surface of the ovary, the follicle swells considerably, and after it has been discharged, the cavity which it leaves behind is filled in by a growth of cells containing a yellow pigment called lutein. This gives to the mass of cells a yellow color and also the name of corpus luteum (yellow body). The cells continue to increase until the corpus luteum at its highest development is about one-third the size of the entire ovary; from that point it begins to be absorbed and finally disappears. The whole process takes something over a month, if the ovum is not fertilized; if, however, conception occurs, the corpus luteum grows larger, and remains in the ovary throughout pregnancy.

Other Pelvic Organs.— *Bladder.*—Besides the reproductive organs the pelvis contains the bladder with its canal, the urethra. As has already been stated, the bladder lies just in front of the uterus, and the two organs can thus act upon each other by pressure. A full bladder may push the uterus backward or even obstruct the passage of the child. The heavy pregnant uterus, crowding against the bladder, may cause irritation, with frequent voiding of urine, or in more extreme cases may even interfere with the emptying of the bladder.

Rectum.—The rectum lies in the pelvis behind the uterus, and is separated from the vagina by a comparatively thin septum of muscle and connective tissue, which is sometimes torn through in the course of a very difficult labor. The pressure of the uterus is likely to cause constipation during pregnancy and sometimes hemorrhoids as well.

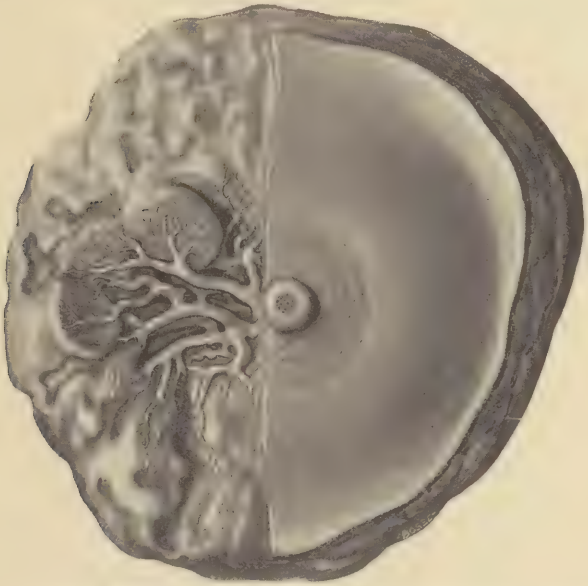

FIG. 12.—Breast, showing lobes, lobules and lactiferous ducts. (Cragin.)

Breasts, or Mammary Glands.—The function of the breasts is to secrete the milk which serves as food for the child for many months after its birth. The glandular substance of the breast is divided by strands of connective tissue into fifteen or twenty lobes, which are subdivided into lobules and again into still smaller areas called acini. The milk is secreted by the cells of the acini. Each lobe has its own duct

to carry the milk to the nipple, from which the fluid can be easily pressed out. True milk is not usually secreted until the third day after delivery, but the milk-sugar and other substances needed are being stored up in the glands throughout pregnancy, and after the second month the breasts contain a watery fluid called colostrum.

Menstruation.—Menstruation is the name given to the periodic discharge of blood from the uterus, usually at intervals of four weeks, from the time of puberty to the menopause. By a cycle of changes occurring every month, the mucous membrane becomes swollen, softened and engorged with blood, which finally escapes in the menstrual flow. The exact cause of menstruation is still under discussion. The process is certainly dependent on the functioning of the ovaries, since it ceases when those organs are removed by operation. According to the latest investigators, the corpus luteum and its secretion play an important part in bringing it about. Whatever the cause, the practical result of the menstrual changes in the endometrium is to provide a place in which the fertilized ovum can be received and nourished by the mother's blood. If conception does not take place, the ovum does not remain in the uterine cavity, and the excess of blood passes out, as already stated. If, on the other hand, the ovum is fertilized and becomes imbedded in the mucous membrane, this blood is needed for its nourishment and is not discharged from the uterus. It thus comes about that the cessation of menstruation is likely to be the first sign of the beginning of pregnancy. The flow does not reappear until after the birth of the child and often not until the end of lactation.

Fertilization of the Ovum.—Although the process of ovulation occurs at regular intervals, the ovum which is discharged cannot develop into a living being unless it has

first been fertilized. The male elements, or spermatozoa, after being introduced into the vagina, make their way up through the uterus and into the tubes by their own power of motion. The meeting of the ovum and spermatozoön takes place while the ovum is still in the tube, and fertilization is accomplished by the entrance of the head of the spermatozoön (which represents its nucleus) into the ovum to unite with its nucleus.

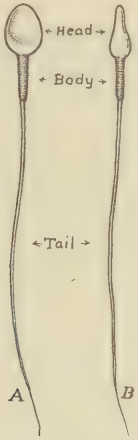

FIG. 13.—Spermatozoa (greatly magnified): *A*, front view; *B*, profile view. (Bacon.)

Sometimes the ovum after conception remains in the tube, caught in the folds of its mucous membrane, and begins to develop there. The resulting pregnancy is called extrauterine or tubal. It is an abnormal and dangerous condition, because the tube is far too small to accommodate the ovum as it grows larger and develops into a child, and consequently it finally ruptures or pushes its contents out through the fimbriated extremity, with serious or even fatal hemorrhage.

As soon as fertilization is accomplished, the ovum begins to grow by dividing into two cells, each of which divides again, and this process continues until a mass is formed, called the morula or mulberry mass. Probably it is at about this stage that it enters the uterine cavity.

Implantation of the Ovum in the Uterus.—It has already been pointed out that the changes in the uterine mucous membrane leading up to menstruation serve to prepare a place for the impregnated ovum. These changes become so marked after conception has occurred that the endometrium receives another name, the *decidua*, during pregnancy. The next question is, how does the ovum become attached to the uterine wall? This is the work of the cells on its outer surface, which are already busily engaged in developing a sac to hold the future fetus. These cells have a special power to eat into other tissue, and when the morula comes in contact with the softened vascular decidua, it burrows down into it by their action. As the ovum at this time is not as large as the head of a small pin, it needs only a very minute hollow, and after it has slipped into its place, the decidua easily and quickly grows over it, so that it is enclosed on all sides. Meanwhile the sac has been formed and now consists of two membranes, one within the other; the inner one is the amnion and the outer the chorion.

Amnion.—The amnion, or inner lining of the sac, is a thin, smooth, transparent membrane, filled with a pale yellowish, watery fluid. The uses of this fluid during pregnancy are many. It provides a medium of constant temperature for the fetus to live in, protects it from injury in case of any blow or shock to the mother, and makes motion easy. It also prevents the amnion from adhering to the fetus. Its most unexpected function is that of supplying fluid to the tissues of the fetus, and possibly even a slight amount of nourish-

ment as well, since the fetus actually swallows it during intra-uterine life. At the time of labor the amniotic fluid has other uses which will be discussed later. It finally escapes toward the end of labor, when, as the common saying is, "the waters break" or, in obstetrical language, the membranes rupture. The amount of fluid at term is about one pint.

FIG. 14.—Fetus in amniotic sac.

Chorion.—The chorion, which lies outside the amnion, begins as a smooth membrane also, but soon changes its character, sending out a quantity of fine, thread-like processes called villi, until the ovum in its membranes looks like a miniature chestnut burr. Later these villi grow longer and branch like very delicate seaweed. They grow into the decidua, eroding its tissues and breaking through the walls of its capillaries, so that the blood flows out around them. They thus accomplish two things, for besides holding the fetal mass firmly attached to the uterine wall, they draw

nourishment from the mother's blood which they can pass on to the fetus through a band of tissue which connects the embryo and the chorion.

Placenta, Membranes and Umbilical Cord.—The decidua which closes over the ovum is only a narrow layer to start

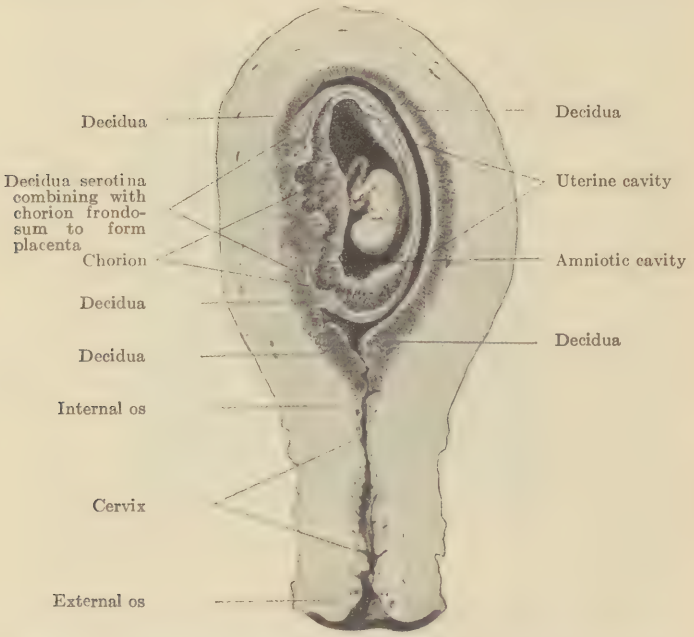

FIG. 15.—Uterus at end of second month showing fetus and formation of placenta. (Bumm.)

with, and as the fetus grows and pushes out into the cavity of the uterus, it is stretched out into a thin membrane. The villi which come in contact with it gradually disappear, until the chorion on that side also becomes a thin membrane called the smooth chorion and the two finally fuse into one.

Meanwhile quite different things are going on in the

decidua serotina, directly beneath the ovum, and the villi on that side. The decidua becomes thicker and more abundantly

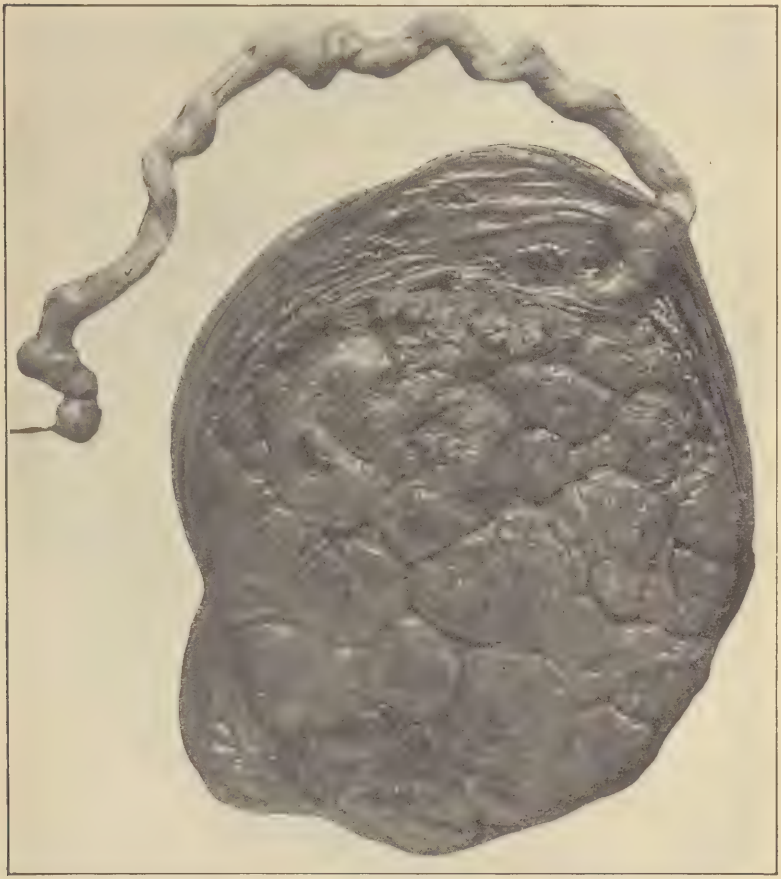

FIG. 16. -Mature placenta, seen from the maternal side, showing the umbilical cord and the placental lobes or cotyledons. (Cragin.)

supplied with bloodvessels, and the villi continue to grow down into it, branching as they go, until the decidua and chorion

(called frondosum on account of its branching structure) are welded together into a solid-looking mass called the placenta.

FIG. 17.—Mature placenta, seen from the fetal side. (Cragin.)

The band of tissue which joined the embryo and the chorion has now stretched out into a cord, running from the placenta

to the umbilicus of the fetus and carrying vessels which connect those in the placenta with the child's circulation.

The placenta at term is a flat, somewhat circular mass, dark red in color, about an inch thick and six or seven inches in diameter. The outer or maternal side toward the uterine wall is divided by deep grooves into irregular-shaped sections called cotyledons; the inner or fetal side is smooth and shows just beneath its surface large bloodvessels entering the umbilical cord, which is usually inserted a little to one side of the center of the placenta.

The cord is about twenty to twenty-five inches long and a little less than an inch thick. It is made of a soft, whitish, mucoid material called Wharton's jelly, in which the umbilical vessels are so imbedded that they are protected from pressure or injury. The protection of these vessels is of more vital importance to the fetus than might at first be realized, for while it is easy enough to see that if they were torn, the child would bleed to death through them, the serious effect of a few minutes' pressure is harder to understand. The point is, that since the umbilical vein carries not only nourishment but oxygen, pressure on it will deprive the fetus of its supply of oxygen, and the child will die from asphyxiation just as any of us would die if we had no air to breathe. It has been found that pressure lasting more than eight minutes is usually fatal.

Development of the Ovum.—Three stages are recognized in the development of the ovum in the uterus:

1. The ovum, a microscopic structure, without definite form; the first two weeks.

2. The embryo, with definite shape but nothing to distinguish it from the embryos of other animals; the third to the fifth week inclusive.

3. The fetus, showing signs of human form; from the end of the fifth week to the end of pregnancy.

After the formation of the morula, fluid appears in its interior, pushing the cells toward the surface and making a cavity at the center. At this stage it is called the blastodermic vesicle. Next there is a thickening of the cells at one point on the surface, and here changes go on rapidly. The cells increase in number, change their shape, arrange themselves in layers and send off branches and folds to form the limbs and the various organs, until with the end of the second week the embryo stage is reached.

During the next three weeks all the organs and systems are being laid down. The spinal canal starts as a groove, closing in by the end of the fourth week. The digestive system appears as two depressions, one at either end of the embryo, which later deepen and push inside the body until they meet, forming a tube from which develop the complicated coils of the intestines. A rudimentary heart, with four tiny chambers, is ready to begin its functions by the fifth week. The primitive kidneys, liver and other organs also appear. Externally, the limb buds push out and there are even the rudiments of features, although the eyes are placed at the sides of the head, giving the face a grotesque appearance. The embryo at the end of the fifth week is so curved on itself that the head and tail ends are close together. It is barely 1 cm. in length.

During the rest of intra-uterine life the fetus is going through the changes which result in the development of the child as we see it at birth. At first the head is very large in proportion to the body, on account of the rapid growth of the brain. The face closes in during the second month. Sometimes the closure is not perfect and the child is born with the well-known deformity of hare-lip or cleft palate,

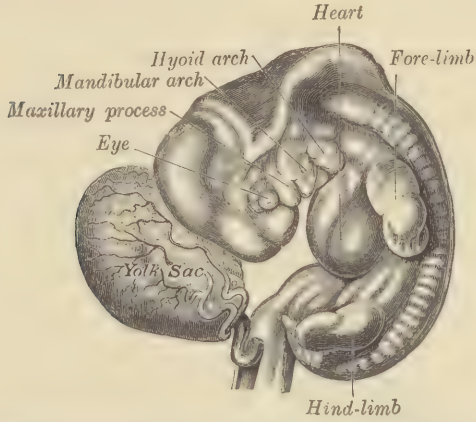

FIG. 18.—Human embryo (magnified) thirty-one to thirty-four days old. (His.)

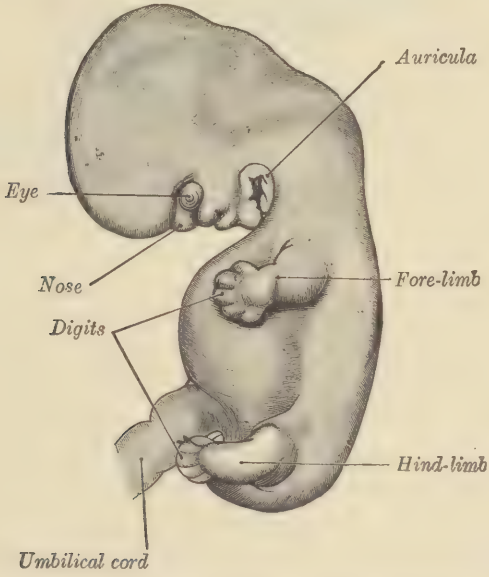

FIG. 19.—Human embryo (magnified) of about six weeks. (His.)

which is caused simply by some arrest in the development at this early stage and not by a fright or any so-called "maternal impression." During this month a layer of skin appears, so thin that the muscles and bloodvessels can be plainly seen through it. The intestines are now well-developed, but the abdominal wall does not close over them until the third month. Cases are sometimes seen in which the child when born has a pouch of intestines still protruding from the umbilicus. The genitalia are present early, but it

FIG. 20.—Child with double cleft palate and protrusion of abdominal contents.

is not until the fourth month that the external organs are sufficiently developed to indicate clearly the sex of the child. In the fifth month the movements of the child become strong enough for the mother to feel them and the fetal heart sounds can be heard through her abdominal wall by a skilled ear. In this month fine downy hairs, the so-called lanugo, begin to grow all over the skin. They usually disappear by the time the child is born, and their presence therefore suggests that it is premature. The glands of the skin also

become active in this month, secreting a whitish, oily sort of substance which is often seen smeared over the body of a newborn baby, especially on its back and in the creases of the skin. This is called vernix caseosa. Fat is one of the last tissues to appear, and the fat layer grows so slowly that even at the seventh or eighth month the fetus is so thin and its skin so wrinkled that it looks strangely old.

SIZE OF THE FETUS AT THE DIFFERENT MONTHS.

Many elaborate tables have been calculated, showing the average length of the fetus at each month, but for practical purposes that of Haase, which is simple and easy to remember, is more satisfactory. According to this, during the first five months the length of the fetus in centimeters equals the square of the number of the month.

1 month	(1 x 1)	1 cm.
2 months	(2 x 2)	4 "
3 "	(3 x 3)	9 "
4 "	(4 x 4)	16 "
5 "	(5 x 5)	25 "

To find the length during the last five months, multiply the number of the month by five.

6 months	(6 x 5)	30 cm.
7 "	(7 x 5)	35 "
8 "	(8 x 5)	40 "
9 "	(9 x 5)	45 "
10 "	(10 x 5)	50 "

The weight varies so much that it is not a reliable guide. The following table is only approximate.

4 months	3 to 4 oz.
5 "	9 to 10 "
6 "	1½ lbs.
7 "	2½ "
8 "	3½ "
9 "	4¾ to 5½ "
10 "	7 to 7½ "

The Fetus at Full Term.—The general appearance of a newborn baby is too familiar to need much description, but a few points in its anatomy are worth mentioning. The child is not simply a grown person in miniature. Its body is long, its limbs relatively short and its head disproportionately large; indeed, the circumference of the head is actually greater than that of the chest.

Internally we find as a characteristic fetal structure the thymus gland, which disappears in later life, but is sometimes so large in the infant that it causes death from pressure on the throat. The digestive system has already been functioning during intra-uterine life and the intestines are filled with waste matter, the meconium, a greenish-black, sticky material, which is sometimes passed during labor if there is much pressure on the fetus. The stomach is smaller than might be supposed, and at birth it cannot comfortably hold more than an ounce—a practical point to remember in feeding a young baby—but the liver is large. The rectum is relatively large and straight, a fact which makes an enema or a colon lavage a rather easy procedure. The kidneys are secreting urine, which may or may not have reached the bladder by the time the child is born.

Since the fetus does not breathe in the uterus, the lungs are solid and contain no air until the child expands them after its birth. There is thus no reason for the blood to pass through the lungs to be aërated, especially as it has already received the necessary oxygen from the placenta. It is accordingly sent directly from one side of the heart to the other through the foramen ovale, a hole between the auricles, and from the pulmonary artery to the aorta through a special communicating vessel, the ductus arteriosus. These structures are characteristic of the fetal circulation and normally close in early infancy. If they remain open, serious heart

trouble results. The child's circulation is so interfered with that its face becomes a dusky, bluish color on the slightest exertion, and early death is the usual end. This is what is commonly meant when a child is said to be a blue baby or to have congenital heart disease.

The Head of the Fetus.—In the process of labor the head is the most important part of the fetus, and it is mentioned so often in all the descriptions that one might suppose it to be the only part concerned. This is because in the great majority of cases (about 96 per cent) the child lies with its head down, so that the head enters the pelvis first and is born first. As the head is also the largest part of the fetus, the management of labor almost resolves itself into a matter of the management of the birth of the head.

The bones of the fetal skull are not welded together, as in the adult, but are loose and movable. Between them are the sutures, narrow spaces covered only by membrane and scalp. The wider spaces formed by the meeting of the sutures are the fontanelles. The main part of the skull is made up of four bones: the two parietal bones, coming from either side to meet in the median line at the sagittal suture; the occipital bone, at the back, separated from them by the lambdoid suture; and anteriorly the frontal bone, which forms the forehead. The other bones of the cranium are of less importance from the obstetrical point of view. The frontal bone is divided into two parts by the frontal suture and is separated from the parietal bones by a transverse suture, the coronal. The fontanelle at the junction of these sutures with the sagittal suture is four-sided and diamond-shaped; it is called the anterior or large fontanelle. A smaller triangular space formed by the meeting of the sagittal and lambdoid sutures is known as the posterior or small fontanelle. In obstetrical terminology the part of the

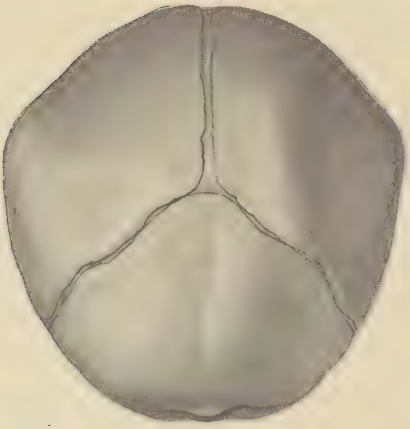

FIG. 21.—The posterior fontanelle. (Cragin.)

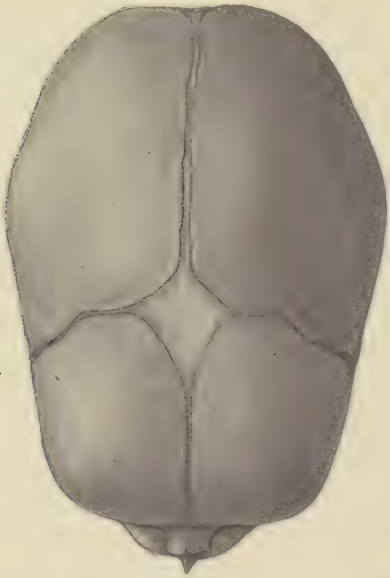

FIG. 22.—The anterior fontanelle. (Cragin.)

head which lies in front of the large fontanelle is the sinciput; the part directly over the fontanelle is the bregma; that between the two fontanelles is the vertex; and that over the occipital bone is the occiput.

The sagittal suture and one or both of the fontanelles can usually be felt if the cervix is at all dilated when an internal examination is made, and they thus serve as useful landmarks to the obstetrician in the diagnosis of the position of the head. The loose structure of the head and the softness of the bones also serve a good purpose in making the head so easily compressible that it can change its shape according to the pressure of the birth canal. If pregnancy continues beyond the allotted ten months, not only does the head grow larger but the bones become harder and less movable, so that labor is more difficult.

The head of the fetus moves with great freedom. Extremes of flexion and extension are easy for it and in rotating, it can turn so far that the face looks obliquely over the shoulder. In this way it can still further accommodate itself to the birth canal. The measurements of the head show that it is longer antero-posteriorly than transversely, and that its smallest circumference is presented in the position of extreme flexion.

PHYSIOLOGY OF THE FETUS.

There is no doubt that the fetus is very favorably situated in intra-uterine life, for it obtains everything without any effort. It does not need to use its lungs or digestive system, because oxygen and nutritious substances are brought from the placenta after they have been absorbed from the mother's blood. The impurities which the blood collects while circulating through the child's body are carried out to the placenta and pass through the villi to be absorbed

back into the mother's blood. Thus the mother not only supplies nourishment for the child but also disposes of its waste products, and the placenta may in a way be considered as a filter between the blood systems of the two, or even, as it is sometimes called, as the lungs and digestive tract of the fetus. Thanks to the amniotic fluid, the child loses no bodily heat, and motion is made so easy that it wastes but little energy. It has been well said that the balance sheet of the fetus shows large receipts and small expenditures.

We have already seen how the amniotic fluid protects the fetus from injury. The placenta, too, has its part to play in protecting it as far as possible from any disease which the mother may have. Since it keeps the mother's blood from mingling with that of the child, it is able for the most part to prevent any bacteria in her system from entering the fetal circulation. In this it succeeds better than was once supposed. The widespread idea that tuberculosis was almost sure to be inherited received a rude blow when the bacteriologists took hold of the problem, for they soon proved that it was rare to find tubercle bacilli or tuberculous lesions in either the child or the placenta. Typhoid bacilli seem better able to make their way through to the fetus, but other bacterial diseases are seldom communicated. Smallpox is transmissible, but occurs so rarely now that it can be omitted as a danger.

The one striking exception to the rule against the transmission of disease from the mother is in the case of syphilis. This disease not only infects the fetus but also deprives it of its proper blood supply by obliterating the bloodvessels in the placenta, and the result is often the death of the fetus while it is still in the uterus, even before full term. Fortunately the drugs which are used in the treatment of syphilis, if given to the mother, are absorbed through

the placenta into the child's system, so that the disease can frequently be prevented or cured if the treatment is started early enough. In this connection it is as well to mention that many drugs are thus passed on through the placenta to the fetus, and that their possible effect must always be considered. This is a particularly practical point to bear in mind when an anesthetic is being given to the mother, as prolonged anesthesia may result in asphyxia of the fetus.

CHAPTER II.

PHYSIOLOGY OF PREGNANCY.

DURATION OF PREGNANCY.

The duration of pregnancy is probably about two hundred and seventy to two hundred and seventy-three days. It cannot be calculated exactly even in the cases where we know the date of the sexual intercourse which preceded it, because we have no way of telling how long a time elapsed before the ovum was fertilized. According to obstetrical custom it is considered as two hundred and eighty days or ten lunar months from the last menstrual period. The obstetrical month always means the lunar month of four weeks. In order to find the expected date of confinement, which is usually the first thing that a patient wishes to know, we calculate as best we may on this basis, and by counting ahead two hundred and eighty days (nine calendar months and one week) from the last menstruation we arrive at a date which is not absolutely correct but is near enough to go by. According to this reckoning, if the last period began February 10, the expected date of the confinement would be November 17. The quickest method of calculating is first to add the week (making February 17) and then count back three months instead of counting ahead nine.

The end of the allotted ten months is called full term or simply term; labor which comes on at or about this time is called full-term labor and the child is a mature or full-term child. When the birth takes place much before term, labor

and child are premature. If the child has reached such a stage of development that it can live outside the uterus, it is said to be viable. In the average case this point is not reached until the end of the seventh obstetrical month or the twenty-eighth week, and it is therefore the rule to consider the fetus not viable if it is born before this time, even though there have been occasional exceptions. An interruption of pregnancy earlier than seven months is a miscarriage, or an abortion if we are using obstetrical language. Since this term has come to have the meaning of criminal abortion associated with it in every-day speech, we do not use it in speaking to patients, but call all cases miscarriages. The birth of a dead child is a still-birth. If the still-born child has been dead in the uterus long enough for decomposition of its tissues to have begun, it is called a macerated fetus.

CHANGES DURING PREGNANCY.

Conception gives rise to a series of changes in the woman's body which are not localized in the uterus or even in the pelvic organs but affect her entire system. Some of these changes are important from the point of view of diagnosis of pregnancy; others produce symptoms which may need special treatment.

Changes in the Uterus.—*Size.*—The change most easily noticed is the steady growth of the uterus, making it possible for an organ but three inches long to hold the child, placenta and amniotic fluid. This is accomplished by:

1. An increase in the size of each muscle fiber to about ten times its normal size.

2. A slight increase in the number of fibers.

3. Stretching of the uterine wall, in the last months, when it can no longer keep pace with the growth of the fetus.

For the first three months the uterus is still in the pelvis and cannot be felt from outside, but after that time the fundus rises above the pelvic brim and can be easily pal-

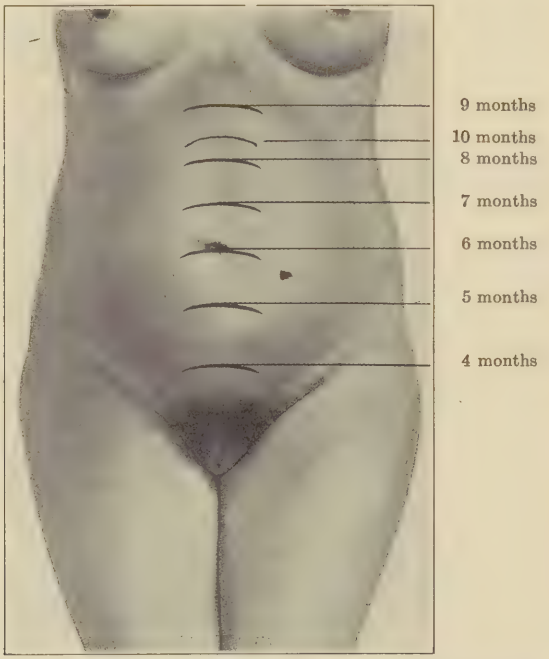

FIG. 23.—Height of the fundus at the different months of pregnancy. (Bumm.)

pated through the abdominal wall. The height of the fundus gives us a fairly satisfactory method of estimating the duration of pregnancy. At the different months it is as follows:

Four months. Two or three fingers' breadth above the symphysis.

Five months. Half way between the symphysis and the umbilicus.

Six months. At the level of the umbilicus.

Seven months. Three fingers' breadth above the umbilicus.

Eight months. Six fingers above the umbilicus.

Nine months. Nine fingers above the umbilicus, or just below the ensiform cartilage at the tip of the sternum.

Ten months, or at term. During the last month the fundus sinks almost to the level of the eighth month.

Roughly speaking, therefore, we may say that the fundus rises at the rate of about three fingers' breadth a month.

These figures apply to primiparæ, that is, women who have not born children and whose abdominal walls are therefore strong enough to hold the uterus up in normal position. In multiparæ, especially those whose muscles have become stretched and lax, the fundus is likely to tip forward and be felt at a lower level. The sinking of the fundus in the last month is caused by a settling of the child's head into the pelvis, called engagement. In multiparæ this often does not occur until the beginning of labor.

Shape.—The uterus in the early months of pregnancy becomes more spherical and later on more oval. The shape, like the size, depends upon its contents, and varies with the position of the child and placenta and the amount of amniotic fluid.

Position.—As the uterus grows larger and heavier, it pulls on its ligaments, and tips farther forward in the pelvis. In the first three months this change in its position can be made out only by an internal examination, but the result is plain enough. As the uterus crowds forward against the bladder, the pressure causes a desire to void the urine and so relieve the irritation by keeping the bladder empty. Frequent

micturition is therefore an early symptom of pregnancy, disappearing in the fourth month as the uterus rises out of the pelvis. After this time the uterus is held up by the abdominal wall, but if the muscles are not strong enough, the fundus may sag far forward.

Consistency and Blood Supply.—The uterus needs a particularly abundant blood supply during pregnancy for two reasons: (1) Because it has grown so much larger that its blood supply must increase accordingly; and (2) because more blood is needed for the fetus. It is no surprise then to learn that its bloodvessels increase in size. The change is most marked in the veins, the largest of which become almost the size of the little finger. Remembering this, it is easy to understand how even a comparatively slight injury to the uterine wall may mean a profuse hemorrhage.

The tissues of the uterus being thus engorged with blood, it becomes softer in consistency, especially in the cervix. The congestion also shows itself in the purplish color of the cervix, which can be seen by using a speculum.

Cessation of Menstruation.—It is an almost universal rule that menstruation ceases during pregnancy. A woman who misses a period after intercourse has good reason to believe that conception has occurred.

Changes in Other Pelvic Organs.—The other pelvic organs, like the uterus, have an increased blood-supply, and the vagina and vulva show the same bluish-purple discoloration as the cervix. Even the pelvic joints receive their share, and allow a little more motion of the bones, on account of the softening of their tissues. The curdy secretion of the vagina is increased. The corpus luteum of pregnancy occupies a large part of the ovary and there is usually no ovulation.

Breasts.—In the first weeks of pregnancy the woman notices a sense of fulness and tingling and perhaps tenderness in the breasts, which is followed by an increase in their size. The areola about the nipple changes color, becoming pinker in blonde women and dark brown in brunettes. Sometimes the color spreads in a circle outside the areola, forming a secondary areola. The so-called Montgomery's

FIG. 24.—Primary areola in a brunette, showing tubercles of Montgomery. (Cragin.)

glands appear as small elevations around the nipples and the nipples themselves grow more prominent. By the third month a watery fluid, the colostrum, can be pressed from the nipples. Sometimes the skin is marked with striæ, lines like pink scars, which radiate out from the nipple.

Skin.—The skin of the abdominal wall is more likely to show the presence of striæ than are the breasts, and the

scar-like stripes are longer and wider and deeper in color when they first appear. Occasionally one of them will even suggest an operation scar. The color gradually fades and old striæ from a previous pregnancy are silvery in appearance.

FIG. 25.—Pigmentation along median line of abdomen; also abdominal striæ. (Cragin.)

There is often a line of brown pigmentation running down the midline of the abdomen, especially in dark-skinned women. Brownish patches of pigment called chloasma may also appear on other parts of the body. When on the face they are rather disfiguring, but fortunately they tend to fade after pregnancy is over.

Circulatory System.—As the heart has so much more work to do during pregnancy, some observers have stated that it

grows temporarily larger. On account of the pressure of the uterus upon the large veins which come from the lower part of the body, the circulation is somewhat interfered with, and it is not at all uncommon for a woman to be troubled with swelling of her feet at the end of the day or after standing a long time. This swelling must not be confused with that due to kidney disease. Varicose veins also result from the interference with the circulation.

Respiratory System.—Like many of the other organs the lungs feel the pressure of the growing uterus, consequently the breathing may be embarrassed in the last months. This is, of course, particularly the case when the uterus is more than normally distended, as by an unusually large fetus, twins or an excess of amniotic fluid. Under such circumstances the sinking of the fundus in the tenth month is often a great relief, and perhaps for that reason is commonly called "lightening." A change in the voice occasionally results from pregnancy and is therefore dreaded by singers.

Digestive System.—The stomach is one of the first organs outside the pelvis to be affected by pregnancy and to make its sensations felt. Often by the end of the first month, rarely even within the first week, the patient is troubled by nausea, with or without vomiting, which comes on the first thing in the morning when she gets up, but usually passes off in the course of the day. This troublesome symptom is familiarly known as "morning sickness." Usually it stops by the end of the third month, but it may grow worse, passing into the serious form of pernicious vomiting. Many women are so fortunate as to escape it altogether. By a wholly unexplained freak of nature, in rare cases it is the husband who suffers from the morning sickness.

As the uterus rises in the abdomen, the intestines are pushed upward and to the sides, and on account of the long-

continued pressure their muscular walls lose their tone. This, added to the interference with defecation which results from the pressure of the uterus on the rectum, makes constipation so common a symptom among pregnant women that it may fairly be included in the list of the normal changes.

General Metabolism and Urinary System.—Since the mother must provide suitable nourishment for the child and eliminate its waste products as well as her own, her bodily processes must be even more than normally active. Various interesting studies have been made to show how she stores up in her tissues the materials which are needed for the growth of the fetus, even preparing a supply of milk sugar to be used in her milk after the child is born. Because of the increased work which is thus going on in all parts of her system, her metabolism is more easily disturbed during pregnancy.

Kidneys.—The kidneys, which have so much to do with the elimination of waste products, are particularly likely to be affected by the strain, and the resulting condition is recognized under the term "kidney of pregnancy." While this is not necessarily serious in itself, it is often only a part of a general disturbance which may develop into grave toxemia, ending in convulsions (the condition called eclampsia), if not treated in time. For this reason the examination of the urine at frequent intervals during pregnancy has come to be a routine procedure, and the findings have often served as a danger signal, so that further trouble has been averted by proper treatment.

The frequent voiding of the urine which is caused by the irritation from the pressure on the bladder in the early months of pregnancy has already been mentioned. This symptom may recur in the last month when the head settles into the pelvis and presses against the bladder.

Blood-pressure.—There is no characteristic change in the blood-pressure during pregnancy, but in the presence of even a beginning toxemia it begins to rise. By taking the blood-pressure at regular intervals the physician may be warned at the onset of this trouble.

Bones and Teeth.—It is generally accepted that the mother builds up the child's bony framework at the expense of the calcium in her bones and teeth. While the bones are almost never affected to any marked degree, the teeth often decay.

Nervous System.—Much mention has been made of a certain nervous irritability and depression of pregnancy as showing an upset nervous equilibrium. Such feelings are in great part only the rather natural result of the discomfort extending over many months and the apprehensions aroused by the lurid obstetrical tales of friends and family. One curious mental twist must, however, be considered characteristic of pregnancy—the craving for strange and often most undesirable articles of food, as for example, chalk or laundry starch.

DIAGNOSIS OF PREGNANCY.

There are many abdominal enlargements that have been confused with pregnancy, sometimes with disastrous results to the patient. Moreover it must be remembered that the matter of diagnosis may concern not only the woman's physical welfare but also her character and reputation. An absolutely sure diagnosis cannot be made without demonstrating the presence of the fetus by one of the following positive signs.

1. Feeling the fetal movements.
2. Outlining the fetal parts.
3. Hearing the fetal heart.

Fetal Movements.—In an internal examination the obstetrician can sometimes bring out what are called the passive movements of the fetus, by pushing it about, as it floats in the amniotic fluid. The active movements are a more reliable sign, however. It has already been stated that by the fifth month of pregnancy the mother is usually able to feel the fetus, and to this sensation the name "quickening" has been given. It is nevertheless quite possible for her to be mistaken, and the sign is therefore considered as positive only when the examiner recognizes the movements. In the latter part of pregnancy, especially if the abdominal wall is thin, movements can be easily seen through it or felt by putting a hand on the abdomen. Earlier, and in cases where the movements are only slight, it is possible to perceive them by listening through the abdominal wall, when a sudden light tap or fluttering can often be made out.

Outlining the Fetal Parts.—The methods of mapping out the fetus will be taken up in describing the examination of the pregnant woman. It is enough to say now that it is quite possible not only to obtain proof of the presence of the fetus but also to discover its exact position in the uterus.

Fetal Heart.—Auscultation of the fetal heart through the abdomen of the mother is now practised so universally that it is hard to realize that it was only a century ago that the sounds were first heard by Mayor, of Geneva, in 1818. The child's heart-rate usually runs from 120 to 160, and is therefore likely to be so much faster than the mother's that there is no trouble in distinguishing between the fetal heart and the pulsation of the large vessels in the mother's abdomen. Moreover, the fetal heart has a double beat like the ticking of a watch. The heart can be heard any time after the end of the fifth month, and even earlier by a skilled ear. Some obstetricians claim that the sex of the child can

be determined by the rate of the heart beat, which should be more rapid in a girl, but no reliance can be placed on this sign. Indeed, it is quite futile to prophesy as to the sex, since no method has yet been discovered by which it can be ascertained.

Although these positive signs may be required to establish the diagnosis of pregnancy in a doubtful or medico-legal case, the physician is usually called upon to make a diagnosis in the early months, before they are available. This he is able to do in the average case, by observing the various signs and symptoms which have already been described among the changes occurring in pregnancy. Most important, from the point of view of diagnosis, are the changes noted in the uterus, which can be made out only by a vaginal examination; but the changes in the breasts, the morning sickness, cessation of menstruation, bladder symptoms, quickening and pigmentation, all aid in completing the clinical picture. If a sufficient number of these signs and symptoms are present, the diagnosis can be made with a fair degree of certainty.

Various tests have been devised, using the mother's blood serum, to prove that pregnancy exists, but they are complicated and not always to be relied upon, and for the present they are not practical aids to diagnosis. The best known among them is that of Abderhalden. The *x*-ray has also been called in to do its part, but the pictures are not satisfactory in the early months.

POSITION OF THE FETUS IN THE UTERUS.

It was once thought that the position of the child in the uterus was merely a matter of chance, and the old books show pictures of all sorts of fantastic poses. The fact of

FIG. 26.—Vertex. Right occipito-anterior position. (Jewett.)

FIG. 27.—Vertex. Left occipito-posterior position. (Jewett.)

FIG. 28.—Vertex. Left occipito-anterior position. (Jewett.)

FIG. 29.—Vertex. Right occipito-posterior position. (Jewett.)

FIG. 30.—Face. Left mento-anterior position. (Jewett.)

FIG. 31.—Face. Right mento-anterior position. (Jewett.)

FIG. 32.—Face. Right mento-posterior position. (Jewett.)

FIG. 33.—Face. Left mento-posterior position. (Jewett.)

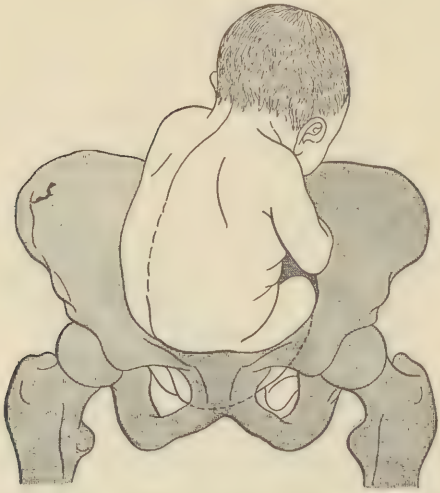

FIG. 34.—Breech. Right sacro-anterior position. (Jewett.)

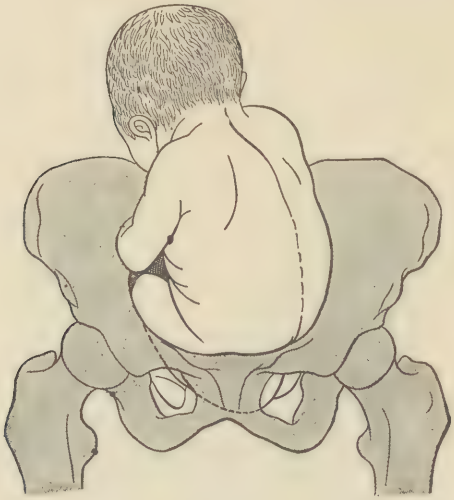

FIG. 35.—Breech. Left sacro-anterior position. (Jewett.)

FIG. 36.—Breech. Right sacro-posterior position. (Jewett.)

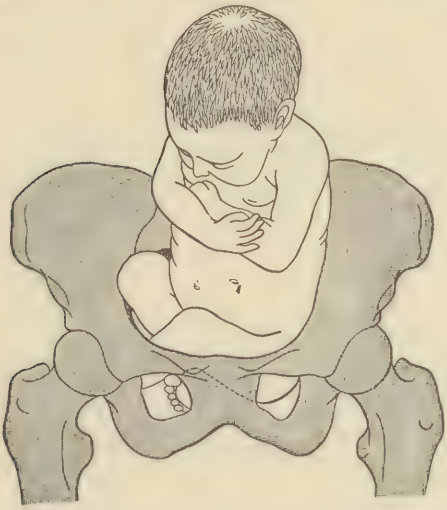

FIG. 37.—Breech. Left sacro-posterior position. (Jewett.)

the matter is that the fetus adapts itself to the shape of the uterine cavity, and the position which it assumes depends

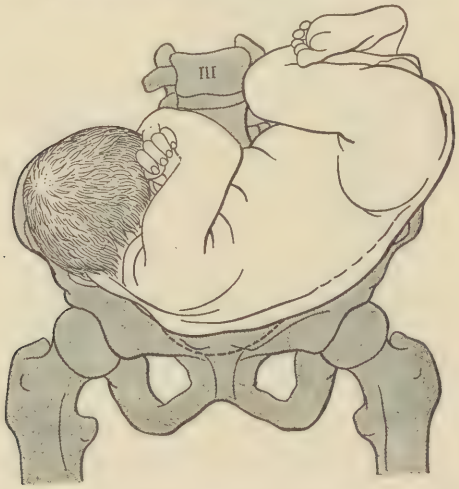

FIG. 38.—Shoulder. Right scapulo-anterior position. (Jewett.)

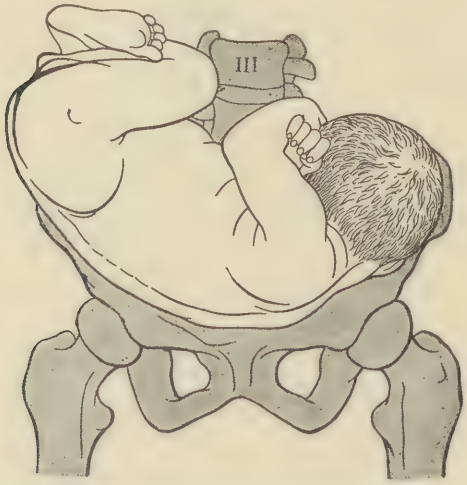

FIG. 39.—Shoulder. Left scapulo-anterior position. (Jewett.)

largely on that. Since the uterus, after the first months of pregnancy, becomes distinctly oval in shape, we should expect to find that the fetus is trying to make an oval mass

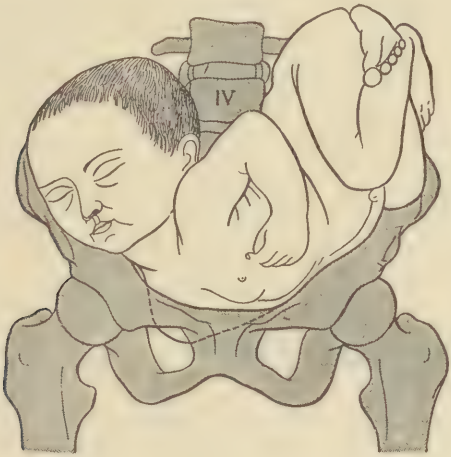

FIG. 40.—Shoulder. Right scapulo-posterior position. (Jewett.)

FIG. 41.—Shoulder. Left scapulo-posterior position. (Jewett.)

of itself, and that is what actually happens. In doing this it takes a position which has been described as one of universal flexion. The thighs are flexed on the abdomen, and the knees on the thighs; the arms are crossed on the chest and the head is bowed over them. The result is what the text-books call the "fetal ovoid," which fits very neatly into the cavity of the uterus. The less amniotic fluid there is in the sac, the closer the uterine walls press against the fetus and the more ovoid becomes the fetal mass; on the other hand, if the fluid is plentiful, the fetus has more freedom of movement, and its legs and arms are not held so close to the body.

As the child's head is less bulky than the buttocks and thighs, and as the lower part of the uterus is a little less roomy than the fundus, it naturally follows that the fetus, in the majority of cases, lies with its head down, as if it were standing on its head. The head will thus be the part of the child which enters the pelvis first, or in obstetrical language, it is the presenting part. The flexion of the head on the chest makes the occiput or vertex the lowest part, and consequently the first to enter the pelvis, and it is therefore customary to call these cases vertex presentations; when, on the other hand, as sometimes happens, the head is above and the buttocks or breech below, the presentation is called a breech. Vertex presentations occur in about 96 per cent of all cases and breech in only about 3 per cent. Rarely the head enters the pelvis without becoming well flexed, so that the brow or face is born first, and these cases are, of course, called brow or face presentation.

In order to describe more definitely how the child lies, we also note how it is turned toward the mother's right or left side, her anterior abdominal wall or her back. It is the presenting part which determines the given position. For

example, if the occiput is turned anteriorly and to the mother's left side, the position is more quickly described by using the obstetrical name, left occipito-anterior, or as it is commonly abbreviated, L. O. A. The other positions of the occiput will, of course, be right occipito-anterior, left occipito-posterior and right occipito-posterior (R. O. A., L. O. P. and R. O. P.). When the breech presents, the positions are named according to the position of the sacrum, left sacro-anterior, etc., abbreviated L. S. A., etc. In face presentations the chin is the determining point and we have right mento-anterior, etc. The left anterior positions are the most frequent and also the most favorable; with the left occipito-anterior heading the list.

In all these presentations the fetus is fitting its ovoid to the oval uterine cavity, and the two have their longest diameters parallel. In about 1 out of every 200 cases, however, the fetus lies in a transverse presentation, that is, horizontally, with its long diameter across the abdomen. This is particularly likely to happen when the uterus is stretched out of its natural shape, perhaps because the woman has born many children, perhaps because there is more than the usual amount of amniotic fluid, so that the fetus floats into a horizontal position. The child is often so movable that we can hardly describe any portion of its anatomy as the presenting part, until labor begins, when the shoulder is gradually pushed down into the pelvis, making a shoulder presentation. It needs little imagination to see that when the child is lying transversely, it cannot pass through the pelvis until the position has been changed in some way by the obstetrician, and that this so-called "cross-birth" always means an operative delivery.

CHAPTER III.

PHYSIOLOGY OF LABOR AND THE PUERPERIUM.

STAGES OF LABOR.

Since the object of the process of labor is to expel the contents of the uterus, it stands to reason that the first step will be to open the cervix wide enough to let the child pass through. It might be supposed that the entire contents—fetus, placenta, membranes and fluid—would come away together in one mass, and this is actually the case in some abortions, but in full-term labors the child is born first, through a rent in the membranes by which the fluid has escaped, and the placenta and membranes follow shortly afterward. Labor is thus divided into three stages:

First stage: Dilatation of the cervix.

Second stage: Expulsion of the child.

Third stage: Delivery of the placenta.

These stages may overlap a little, but for practical purposes they may be described separately.

Onset of Labor.—During the last two weeks of pregnancy the woman often has vague, irregular, premonitory pains, which may be severe enough to be misleading, and occasionally the doctor is called on account of these pains or others which prove to be only the result of some digestive disturbance. The onset of true labor is characterized by the regularity of the pains and the contractions of the uterus which accompany them. If the abdomen is palpated, the uterus can be felt to grow hard beneath the hand and also

to press forward a little with each pain. Another sign of the beginning of labor, familiarly known as the "show," is a discharge of blood-stained mucus from the cervix.

First Stage.—The first pains come at long intervals, perhaps half an hour apart, but the intervals soon become shorter, and when the first stage is well under way, the pains are coming every three to five minutes. It is usually stated that the first pains are felt in the back, and that they gradually radiate around to the abdomen, running along the sides and down the thighs, but there is no real rule in this matter, and the pains are often felt in the back throughout the first stage, while at other times they are only in the abdomen.

As the uterus contracts, its walls press against the sac of amniotic fluid (the bag of waters, as it is often called), which becomes tense, bulging into the cervical canal with each pain and helping to stretch it open. The contractions also push the presenting part down against the internal os, and this reinforces the pressure of the fluid. Since all this pressure is from above, the upper part of the cervix is naturally the first to be dilated, and in a primipara the external os dilates hardly at all until the canal has been stretched open from above—obliterated, as we say. In a multipara the obliteration of the canal and the dilatation of the external os go on more or less together. The process continues until the cervix is completely dilated and rolls back from the presenting part, so that the fetus can be pushed out of the uterus. At this point the membranes usually rupture and the fluid escapes, for the bag of waters has done its work in aiding the dilatation and is only in the way during the descent of the child through the vagina. If the membranes rupture early in labor, or, as sometimes happens, even before the pains have started, the labor is much pro-

longed, because the head alone does not dilate the parts as well as when combined with the fluid. This is called dry labor.

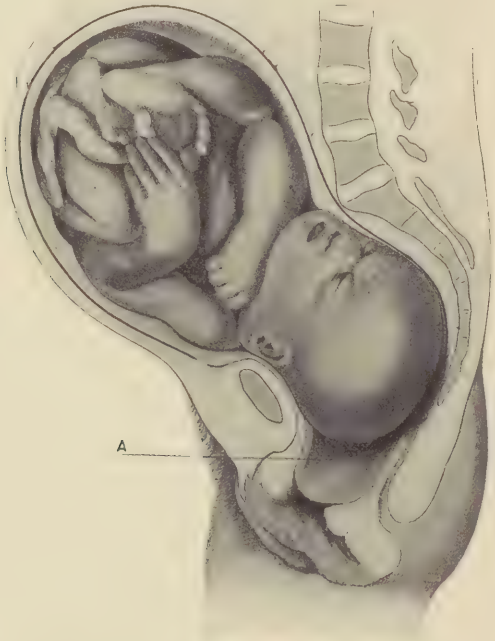

FIG. 42.—Sagittal section through the pelvis and uterus near the end of the first stage of labor, showing the posture of the child and also the bag of water intact (*A*). (Bumm.)

The duration of the first stage varies within rather wide limits. It is naturally much longer for a primipara, whose cervix is being stretched for the first time, than for a multipara in whom the parts have already been stretched by child-bearing. Dry labor also prolongs the process. Dilatation will proceed more slowly when the presenting part

is not far enough down to add to the pressure against the internal os. The length of the first stage averages from six to eight hours in a multipara and from twelve to fifteen in a primipara.

Second Stage.—With the second stage of labor come the bearing-down pains, in which strong voluntary efforts of

FIG. 43.—Beginning of the exit of the head. The perineum is distended and the head visible. (Bumm.)

the abdominal muscles are added to the involuntary uterine contractions to bring about the birth of the child. If the membranes have not already ruptured at the end of the first stage, when dilatation was complete, the physician ruptures the sac, as the expulsion of the child is quicker after the fluid has drained off. The presenting part is driven down

into the vagina with each pain, receding a little after the pain is over, so that the vagina and vulva are gradually stretched to allow the passage of the child. Just as the cervix was dilated until its edge was thinned and there was space enough for the head to pass through, so the vagina is spread open and the perineum is thinned by the pressure.

FIG. 44.—The head is about to pass through the vulvar ring in the sub-occipito-frontal circumference. (Bumm.)

Presently the scalp of the child can be seen through the vaginal opening at the height of a pain, and little by little the head pushes through, followed by the shoulders and the rest of the body. The pains meanwhile grow more and more severe, often with shorter intervals between them, until they are almost unbearable during the birth of the child through the vaginal outlet.

The second stage of labor, like the first, varies greatly in length. It averages almost two hours in a primipara, while in a multipara with a roomy, lax vagina, three or four strong pains may suffice to complete the birth.

Mechanism of Labor.—The expulsion of the child in the second stage of labor amounts to something more than simply pushing it straight down the vagina in whatever position it happens to be lying. In almost every case the fetus turns in different ways to accommodate itself to the shape of the birth canal. These movements constitute what is known as the mechanism of labor.

In describing the mechanism of labor the left occipito-anterior position, being by far the most frequent, can be taken as the type of normal labor. In these cases the head engages in the superior strait with the occiput to the left and anterior and the brow to the right and posterior, and the sagittal suture thus lies in the right oblique diameter of the pelvis. It remains in this position while the fetus is descending through the birth canal, but just before it has reached the pelvic outlet the occiput begins to turn anteriorly until it is directly under the symphysis and the face in the hollow of the sacrum, making the suture lie antero-posteriorly. This movement is called internal rotation because the rotation occurs within the birth canal. If the head is not well flexed when it enters the pelvis, the flexion gradually increases with its descent until its smallest circumference (the suboccipito-bregmatic) is passing down the vagina.

The head thus reaches the pelvic floor well flexed and ready to be expelled. On account of the upward turn of the vagina the head, if driven horizontally, would tear its way through the perineum into the rectum in its effort to emerge. This is avoided by a movement of extension which sends the occiput upward through the vaginal opening, and the head is therefore said to be born by extension.

During all this time the shoulders are still lying obliquely in the pelvis, for it is only the head that has been concerned in the movements which have just been described. It is now their turn to rotate so that one of them comes under the symphysis and the other into the hollow of the sacrum. The head helps them by turning itself until the occiput points directly to the left side and the face to the right. This movement is external rotation, because the head is now outside the canal. The shoulders are thus given a start, and while the anterior remains wedged at the symphysis, the posterior slips down along the curve of the sacrum until it is born. The anterior shoulder then comes out and the rest of the body follows.

The different steps of the mechanism of labor are thus seen to be:

1. Descent.
2. Flexion.
3. Internal rotation.
4. Extension.
5. External rotation.

Engagement may be added as a preliminary step, since it may form a part of the process of labor, although it has often occurred before labor began.

Moulding of the Head.—In the average case the child's head cannot make its way through the birth canal without receiving more or less pressure from the bony pelvis and the muscular walls of the vagina. Since the bones of the skull have not yet grown together at all and are still soft enough to be easily compressed, they respond to the pressure by slipping over one another in whatever way will make the head best fit the space through which it must travel. This process is called the moulding or configuration of the head.

Usually it is enough if one parietal bone overrides the other

at the sagittal suture, narrowing the head from side to side, but if there is much disproportion between the head and the pelvis, the head can be made still smaller by the pushing of the frontal and occipital bones under the parietals. The head thus becomes much distorted in its shape, growing long and narrow and sometimes even one-sided, but it can always recover its natural shape after the child is born.

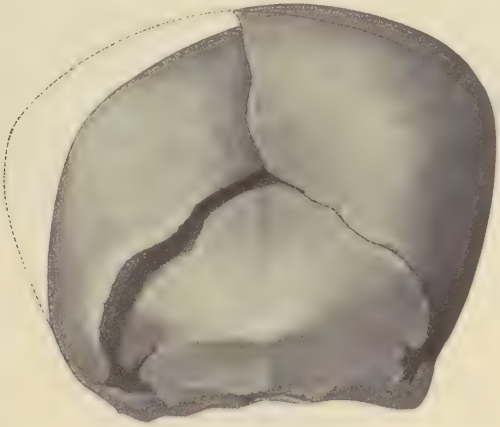

FIG. 45.—Fetal skull, showing displacement of bones in moulding as in Fig. 47. The right parietal bone projects over the left and both over the occipital. (Bumm.)

When there is much pressure, a soft swelling often appears in the scalp on the part of the head which is lowest in the birth canal, usually just above the occiput, so that the head looks even longer. This is the caput succedaneum, usually called simply the caput. It is especially likely to develop when the membranes rupture too early and the head is pressed close against the cervix during its dilatation. In such a case the caput serves a useful purpose in acting as a substitute for the bag of waters and aiding in the dilatation of the cervix. Indeed, a marked caput has sometimes been mistaken for tense membranes.

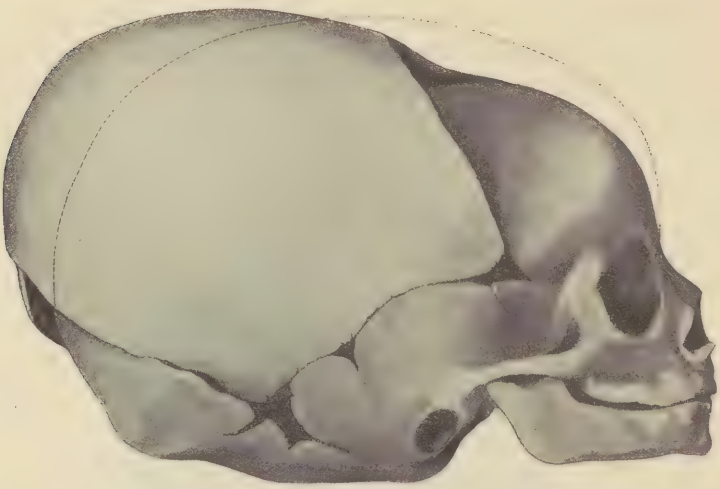

FIG. 46.—Fetal skull, showing displacement of bones in moulding, as in Fig. 48. The parietal bones project over both the frontal and occipital. (Bumm.)

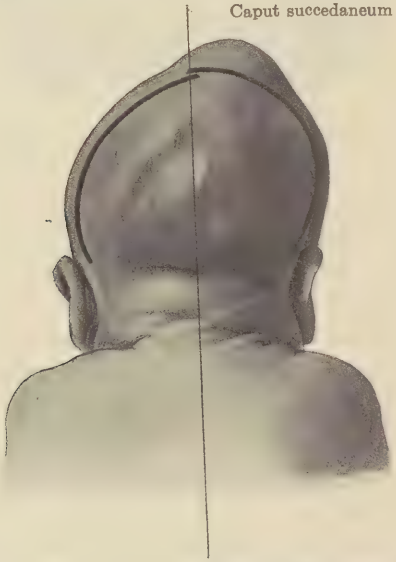

FIG. 47.—Moulding of fetal head during labor. Bone displacements shown in Fig. 45. Caput succedaneum also shown. (Bumm.)

Third Stage of Labor.— *Detachment and Expulsion of the Placenta.*—The third stage of labor may be considered as having two parts: (1) The detachment of the placenta and (2) its expulsion. Immediately after the birth of the child the walls of the uterus, which have been stretched for so many months, retract and thicken, just as any elastic material would do when released from the strain of long stretching. Retraction is thus quite different from the

FIG. 48.—Moulding of fetal head during labor. (Bumm.)

active contraction of the uterine muscle, and the two must not be confused. As a result of the retraction of its walls, combined with the muscular contractions, which still continue, the uterus, which perhaps reached nearly to the tip of the sternum, is now found below the umbilicus, and its cavity becomes correspondingly smaller. This sudden change in the surface to which it has been attached causes the placenta to begin to peel away from the uterine wall, and within a half hour, often in but a few minutes, it is entirely separated and ready to be expelled.

The detachment of the placenta may start at the edge (Duncan mechanism) or at the center (Schultze mechanism); either method is normal. In the former case blood is seen escaping from the vagina throughout the process of separation and the placenta slips out edgewise. In the latter there is little or no bleeding to be seen, because the blood is held back in the cup-like depression of the placenta; and the placenta emerges with the flat fetal surface first and its edges folded back, looking not unlike an umbrella which has been turned inside out. The blood which has been kept back in the uterus follows with a sudden gush.

In the absolutely normal case the expulsion of the placenta is accomplished by an additional bearing-down movement on the part of the woman, but practically this often fails, and it is necessary for the physician or nurse to lend aid by making pressure on the fundus.

The cavity of the uterus is now empty, and its walls retract and contract still further. The muscle fibers compress the vessels which run among them, and in this way prevent any great flow of blood from the open surface left by the detachment of the placenta. The escape of blood is further controlled by the formation of clots which very effectually plug the mouths of the vessels. If there is any interference with the contraction and retraction of the uterus or the coagulation of the blood, serious or even fatal hemorrhage may result.

The Puerperium.—This is the period of reconstruction and return to normal. The muscle fibers of the uterus, which underwent such marked hypertrophy during pregnancy, now begin to degenerate and shrink down until the uterus is once more a pelvic organ. The raw surface left by the separation of the placenta and membranes must heal over and a new endometrium must form. First, however, any

shreds of dead tissue and bits of blood clot which would delay the healing process, are discharged from the uterus until there is a clean surface from which to regenerate the new mucous membrane. Any lacerations and injuries of the birth canal will also be undergoing repair as far as possible.

Involution, the process by which the uterus returns to its normal condition, requires about six weeks for its completion. For a time the decrease in the size of the organ can be easily followed by palpating the abdomen from day to day and noting the height of the fundus. By the end of the tenth day in the average case, this has come down to the level of the symphysis and after that it can no longer be felt by external palpation alone.

Lochia.—During the early part of the puerperium there is a discharge from the uterus called the lochia, which consists of débris and waste material. For the first two or three days this is made up largely of blood which oozes out from the inner surface of the uterus, and therefore receives the name of *lochia rubra*, or red lochia. This presently gives way to a pinkish or blood-streaked discharge, the *lochia serosa*, which is in turn replaced by a whitish, mucous discharge, the *lochia alba*. These three stages are not clear-cut and are likely to overlap more or less. In the average case the lochia rubra and serosa together cover a period of about a week, while the lochia alba lasts for a week or ten days.

Lactation.—A very different process, which might be called constructive, begins in the puerperium. This is lactation, the establishment of the milk secretion. By the second or third day after delivery the colostrum which has been in the breasts during pregnancy changes to the milk which is needed for the nourishment of the child.

CHAPTER IV.

MANAGEMENT OF PREGNANCY.

EXAMINATION OF THE PREGNANT WOMAN.

Pelvic Measurements.—As it is of the greatest importance to the obstetrician to know whether his patient has a pelvis of normal size and shape, certain measurements have been devised, which are taken with the pelvimeter, an instrument not unlike a pair of calipers, and these measurements are now a part of every routine examination. While it is not to be expected that every nurse will perfect herself in the exact technic of taking them, she should at least know what they are, in order to have an intelligent understanding of her cases, and how they are taken, in order to prepare a patient for the examination.

The measurements in common use are:

1. Interspinous, the distance between the anterior-superior iliac spines, 25 to 26 cm. (10 to 10½ inches).

2. Intercristal, between the iliac crests, 28 to 29 cm. (11 to 11½ inches).

3. Intertrochanteric, between the great trochanters, 30 to 32 cm. (12½ inches).

4. Transverse diameter of the outlet, between the ischial tuberosities, 10 to 11 cm. (4 inches).

5. External conjugate or Baudelocque's diameter, from the spine of the last lumbar vertebra to the symphysis, 20 to 21 cm. (8 inches).

From the first two measurements we get information as

to the width of the pelvic inlet; from the next two, as to the width of the pelvic outlet; from the last, as to the antero-posterior measurement of the inlet. These are all external measurements. The patient is prepared by having her clothing drawn away from the hips and lower abdomen. For the first three measurements she lies on her back, with

FIG. 49.—Measuring the iliac spines. (Bumm)

her legs extended or flexed, as the physician may prefer; for the fourth, in the dorsal or lithotomy position, with the thighs well flexed; for the fifth, she lies on her side or stands.

If these measurements are normal, no internal measurement is necessary in most cases. If, however, Baudelocque's diameter is much below normal, a more accurate internal

measurement, the diagonal conjugate, is added to the list. This runs from the lower border of the symphysis to the promontory of the sacrum and should measure 13 cm. (5 inches). The patient lies in the dorsal position and is prepared as for any vaginal examination. The physician takes the measurement with the finger, and the length is then measured on the finger with the pelvimeter.

FIG. 50.—Measuring the external conjugate (Baudelocque's diameter.) (Bumm.)

Some obstetricians include in their routine the oblique diameters, taken externally from the anterior superior spine on one side to the posterior superior spine on the other. These should normally be the same length (21 cm.) and any marked difference between them is a sign of an asymmetrical

pelvis. The patient lies on her side or stands during the procedure.

Supposing the diagnosis of pregnancy to have been made and the measurements taken, there still remain many points of importance to be brought out by external examination. Chief among them are:

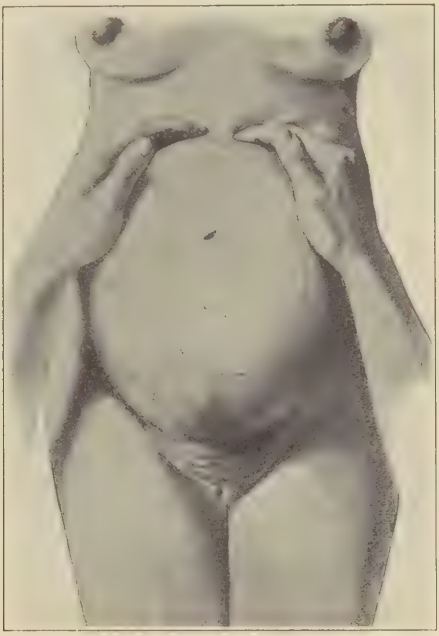

FIG. 51.—Palpating the fundus. (Bumm.)

1. The probable duration of pregnancy.
2. The size of the child.
3. The presentation and position.
4. The engagement of the presenting part.
5. Whether the child is alive.

We rely on palpation of the uterus through the abdominal wall to give us most of this information.

By palpating the fundus we determine first its height with reference to the symphysis, the umbilicus or the ensiform, in order to get an idea of the approximate duration of the pregnancy. By deeper palpation we find out what part of

FIG. 52.—Palpating the back and small parts. (Bumm.)

the fetus is occupying the fundus, and thus gain a point in the diagnosis of the presentation. The head is distinguished from the breech by being less bulky, harder and more movable, and its rounded shape is especially characteristic.

Next comes the palpation of the two sides of the abdomen. On one side will be felt the smooth, firm plane of the child's back, while on the other the small parts, as the limbs are

called in obstetrical language, make the outline more irregular, and the shape of a leg or arm can often be felt. In the rare transverse presentations the head will be found at one side and the breech at the other.

FIG. 53.—Palpating the presenting part. (Bumm.)

In the lower part of the uterus, just above the symphysis, we locate the presenting part, which will be freely movable unless the examination is made in the last month of pregnancy, when it may have descended into the pelvis and become firmly engaged.

There still remains to be established the very important point, whether the child is alive—or "quick," in the quaint

term of former days, which is preserved in law terms even now. The movement of the fetus or the sound of its heart beats is a sure sign. The fetus is often so active in the last months that mere inspection of the abdomen is enough to prove the presence of a living child, and the movements may also be felt by palpation; but in a large pro-

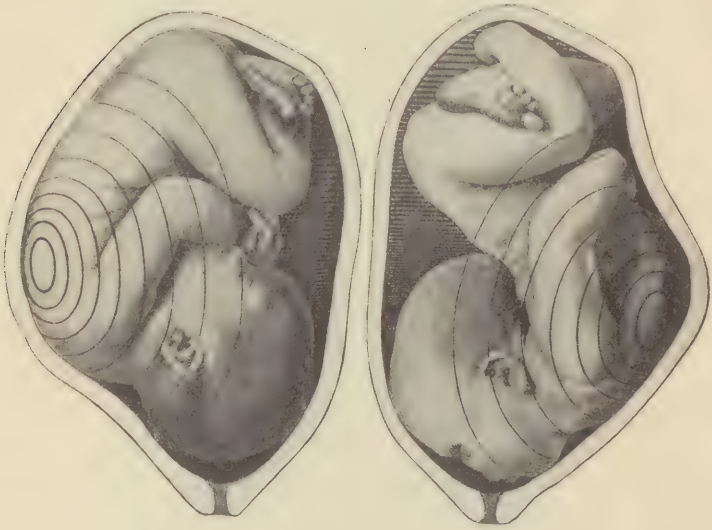

FIG. 54 FIG. 55

FIGS. 54 and 55.—Auscultation for fetal heart sounds in vertex and face presentations. (Bumm.)

portion of the cases we resort to auscultation of the fetal heart, using either the ear or a stethoscope. Contrary to what might be supposed, except in face presentations the child's heart is heard best on the side of the mother's abdomen toward which its back, not its chest, is turned, for the very good reason that the arms folded over the chest and the flexed head usually obstruct the sound on that side.

In vertex presentations the heart is heard in the lower part of the abdomen; in breech presentations, at about the level of the umbilicus or even above it. In anterior positions it is heard through the anterior abdominal wall; in posterior positions, toward the flank of the mother. For

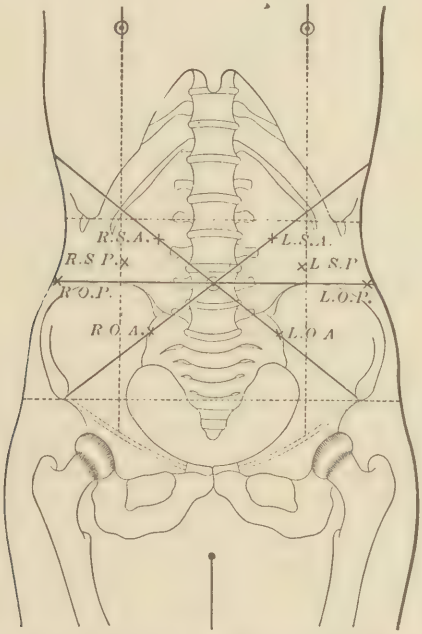

FIG. 56.—Illustrating the points of maximum intensity of fetal heart sounds in vertex and breech presentation. (Bumm.)

example, in a case of right occipito-posterior (R. O. P.) we should listen for the heart in the right flank; in left sacro-anterior (L. S. A.), a little to the left of the umbilicus. The location of the heart may thus be an aid to the diagnosis of the position of the fetus when the other findings have been obscure.

Sometimes while listening for the fetal heart we hear a soft blowing or whistling sound instead of clear-cut pulsations. This sound, which is called a souffle, is caused by the blood in the vessels of the uterus or the umbilical cord. In the former case it will have the same rate as the mother's pulse and is therefore known as the maternal souffle. In the latter, its rate will be that of the fetal heart, and the sound is called the fetal or funic souffle.

As an example of a diagnosis made by external examination, let us take the findings in a given case. The fundus is three fingers' breadth above the umbilicus; the breech is in the fundus, the back to the left side, the small parts to the right; the head is below, not engaged; the fetal heart is heard in the left lower quadrant of the abdomen. The diagnosis here would be seven months' pregnancy, vertex presentation, left occipito-anterior (L. O. A.).

Most physicians will not expect the nurse to be proficient in obstetrical diagnosis and its technic, except in one point, the auscultation of the fetal heart. As we shall see later, it is often necessary to watch the heart very closely during labor, as a guide to the condition of the child, and the nurse will often be relied upon to do this. She should, therefore, take advantage of every possible opportunity to listen to a fetal heart. In this way alone can she become familiar with the sounds and learn to count accurately, so that she will at once notice any change in its rate, regularity or character. While many physicians prefer to use a stethoscope, it is absolutely necessary to become skilled in detecting the heart sounds with the ear, and especially so for the nurse, who does not usually carry a stethoscope. When listening, if there is any doubt whether sounds are fetal or maternal, the point may be cleared up by taking the mother's pulse and comparing the rate. Indeed, this is a wise precaution

in any case, as the mother's heart is sometimes unexpectedly rapid.

During the examination the patient lies on her back, with her clothes drawn away from her abdomen. A sheet may be draped over the pubis and hips and a towel used to cover her clothes above. This is particularly desirable for clinic patients, whose clothing is not always clean. If the ear is to be used in listening to the fetal heart, another towel or a piece of gauze should be provided to lay on the abdomen during auscultation. The towel must not be too thick or it will interfere with hearing the sounds.

The examiner stands beside the patient, facing toward her head, using two hands while palpating the fundus and the sides of the abdomen, and one hand, with the fingers and thumb spread wide apart, to grasp the head in palpating above the symphysis. When the head is engaged or far back in the abdominal cavity, it is more easily felt if the examiner faces toward the patient's feet and uses both hands, pressing in deeply but always gently from the two sides.

Internal Examinations in Pregnancy.—Internal examinations are made for the purpose of establishing the diagnosis of pregnancy or confirming the diagnosis of the presentation of the fetus in a doubtful case. They also give the physician information about the shape and size of the birth canal and the condition of its tissues. If the external measurements are small, the diagonal conjugate is taken by means of a vaginal examination. The value of internal examinations during labor will be explained later.

Preparation of the Patient.—The patient lies on her back with the thighs and knees flexed and the knees widely separated. If she is on an examining table, her hips are brought to the edge of the table and her feet supported by stirrups. In a private home she may lie across the bed, with her hips

close to the edge and her feet resting on chairs or held by the nurse or other attendant. The doctor can often make a sufficiently satisfactory examination without having her thus turned across the bed.

A clean sheet is draped over the legs and lower abdomen, leaving the vulva exposed. The vulva is then cleansed thoroughly but gently, as the tissues are sensitive and easily irritated. Cotton balls or pieces of gauze are substituted

FIG. 57.—Patient draped with sheet ready for examination. (Cragin.)

for the brush. The routine procedure is soap and water, followed by bichloride, lysol or other antiseptic solution. The washing is done from above downward, and a piece of cotton which has come in contact with the anal region must not touch the vulva. After the vulva has been cleansed externally, the labia are separated carefully with the fingers of one hand, and the parts between are washed with fresh gauze and irrigated with sterile water and the antiseptic

solution. If the physician is not ready to make the examination, a sterile pad or towel is laid over the vulva. On no account must the draping sheet, which is not sterile, come in contact with the vulva, as this would simply undo the whole work.

Hand Disinfection.—Disinfection of the hands is quite as important in obstetrics as in surgery. Various methods have been described, but all are founded on one basic principle, thorough scrubbing at the start. A nurse will make it a point to find out the technic used by the physician, so as to have in readiness his chosen solutions.

The hands are first scrubbed with soap and water and a brush for from five to ten minutes. For making a single vaginal examination at a clinic it will be enough to scrub well above the wrists, but in preparing for a delivery the obstetrician scrubs up to the elbows. Special care is taken to remove all material from under and about the nails, and for this a nail-cleaner or an orange-stick will be needed. Brushes are sterilized by boiling for at least ten minutes and the nail-cleaners can be kept in an antiseptic solution. Green soap has long been the standard for surgical use. If a liquid is preferred, the tincture of green soap or any of the good liquid soaps made by reliable surgical supply houses can be used; enough for a single scrubbing is poured into a flat dish into which the brush can be easily dipped. It is against all rules of aseptic technic to handle a bottle or other container while cleansing the hands. If no other soap is available, as in an emergency call, a new cake of Ivory soap will answer the purpose. On no account should one rely on a piece which has been used by the family or lying about, collecting dirt and germs.

After thorough cleansing the hands and arms are soaked in an antiseptic solution for at least two minutes. Bichlo-

ride of mercury 1:1000 is as safe as any, but is so irritating to the skin of many people that lysol solution or alcohol is often preferred. The latter is now so difficult to procure that it is no longer found as a matter of course in the average home.

Rubber gloves are a routine part of the process of preparing for an obstetrical examination. They protect patient and physician alike. In a hospital they are best dry-sterilized, powdered and placed in a sterile wrapper. The cuff should be turned back so that the gloves can be easily drawn on. In the home, unless the doctor brings his gloves ready-sterilized, they are prepared by boiling for ten minutes. If they must be reboiled after using, the nurse will first carefully wash off any traces of blood or mucus which may be left from the previous examination, as boiling will only coagulate such material and make it stick to the rubber.

HYGIENE OF PREGNANCY.

The care of a pregnant woman should always include clear directions as to her mode of living. In general it may be said that if she has been leading a healthy, well-ordered life, without too much heavy work or over-vigorous exercise, the nearer she can keep to her accustomed habits the better. Nothing is worse than for her suddenly to give up her usual activities and sit down at home with only thoughts of her condition to occupy her. Her life should be as healthy and normal as possible, from both the physical and the mental point of view.

Diet.—Since the mother is providing the nourishment for the child as well as for herself, she must keep herself well-nourished, but that does not mean that she must "eat for two," in the familiar phrase, since overloading her stomach and overtaxing her kidneys and digestive system may have

serious effects. Various diets have been suggested, with the idea of limiting the size of the child or its bony development, so that the birth will be easier. Unfortunately these ideas have not been borne out by the facts, and the woman who diets herself with this mistaken notion only weakens herself quite unnecessarily, as the child will get what it needs for its development, except in cases of extreme malnutrition of the mother.

As to the choice of foods, their chief requisites are that they shall be nourishing and easily digested. In spite of the old idea that an expectant mother should eat much rich food, simpler things are better for her, provided they contain the necessary nourishment. She should avoid rich pastry and greasy, fried things, and she should limit her ration of meat, as that also taxes the digestion and the kidneys during pregnancy. If a patient is showing the slightest signs of toxemia, almost the first order is to cut out meat from her dietary, and even if conditions are normal, she will do well to take it only once a day. As proper elimination is especially important for a pregnant woman, she should take fruit, green vegetables and cereals in plenty, and avoid constipating foods. Tea or coffee once a day will do no harm, but their use should be restricted. Milk is one of the simplest and best of foods, and if the patient likes it, she may take a quart a day. If she does not care for it or thinks that it makes her "bilious," it can be used freely on cereals or served up as junket or soup, or in cocoa. Water is an excellent diuretic, and six to eight glasses a day are none too much. Alcohol in any form is better omitted during pregnancy.

Dress.—The clothing must be comfortable and sightly. Fortunately the days of the wasp-waist have gone by and women can wear the rather loose garments of the modern

styles without exciting attention, even when fairly advanced in pregnancy. Most women feel the need of some sort of support of the abdomen, and will do well to wear a corset, provided it does not press on the uterus in such a way as to force it or the fetus into a bad position. An ordinary corset may be worn, but the various types of maternity corset which are on the market are usually more satisfactory. A woman whose abdominal wall is loose and stretched by previous pregnancies will sometimes need to wear a special abdominal supporter. It is a mistake to suppose that a tight corset will "preserve the figure," as the saying is. By its pressure the muscles of the abdomen, which need special strength at the time of labor, are so weakened that they are far more likely to be lax and flabby after the confinement. Clothing which hangs heavily on the hips should be avoided, as also tight bands. Round garters interfere with the circulation in the legs and predispose to varicose veins. The modern high-heeled shoes are particularly pernicious for the pregnant woman, as they throw the weight farther forward and increase the strain on the abdominal walls.

Exercise and Bathing.—A moderate amount of exercise is needed to keep up the woman's muscle tone, but pregnancy is not the time to try to work up muscular strength, and she should not overtire herself. Walking is the easiest form of exercise, and the fresh air adds to the benefit from it. If she must stay in the house, she should cultivate the habit of open windows and deep-breathing exercises. Any violent exercise or work which involves straining, heavy lifting or long hours of standing is to be avoided. Many women are so situated that they must do their own housework, and if the heavier part can be avoided, this does no harm, especially if it is done with the windows open as much as possible. Automobile riding over rough roads has often brought on a

miscarriage, and trolley-cars, with their jolting and crowding and the frequent necessity of hanging to a strap during a large part of the way, are not much better. The woman should try not to ride at the rush hours, and should always "watch her step," as a sudden start might give her a bad fall.

Bathing every day keeps the skin in good condition and helps elimination through that channel. Cold showers and sprays are better omitted. In the early months sea-bathing in calm water may be permitted, but not if the water or the day be cold, as the chilling of the body may be dangerous. Surf bathing should be absolutely prohibited at all times.

Bowels and Kidneys.—On account of the pressure of the uterus on the intestines constipation is so common during pregnancy that special attention must be paid to the care of the bowels, the more so because of the danger of toxemia when they are inactive. Although diet and plenty of water to drink will help, it is often necessary to supplement hygiene by drugs. A pregnant woman should never take cathartic pills because they are advertised at the drug store or prescribed by interested friends, as they may contain drugs which are too drastic and lead to straining and hemorrhoids, or even to miscarriage. Cascara, milk of magnesia and phenolphthalein are all safe enough and the various forms of mineral oils are often effective. The simpler saline laxatives, like sodium phosphate and the laxative mineral waters are helpful, chiefly because they make the patient drink a full quota of water, which is of benefit to the kidneys as well.

Free elimination of urine is a necessity, if toxemia is to be avoided. The pregnant woman should pass at least three pints of urine in the twenty-four hours. If the output is scanty, extra fluids should be ordered. If the result is not

satisfactory, diuretic drugs are prescribed; among the commonest are potassium citrate and Basham's mixture. The urine should be brought to the physician for examination at intervals varying from one to four weeks, according to the time in pregnancy.

Care of the Breasts.—The breasts require special care during pregnancy to prepare them for the nursing period. There should be no pressure on them from the clothing, and if they are large or heavy, a support must be worn. The nipples may be anointed with any bland ointment or oil to soften them; if the skin over them is very sensitive, applications of a mildly astringent lotion will harden it. A mixture of boric acid and 50 per cent alcohol may be used, and glycerite of tannin in weak solution and witch-hazel are also advised. While it may be necessary to draw out flat or inverted nipples, manipulation should be avoided as far as possible, as tending to cause irritation.

Prevention of Miscarriage.—The patient should be warned of the dangers of miscarriage and cautioned against overwork, straining efforts, jolting rides and sudden jars, and anything which might cause uterine congestion, especially in the first three months of pregnancy before the placenta is fully formed and firmly attached to the wall of the uterus. For this reason intercourse, with its resulting congestion, may be a danger in the early months, apart from other considerations; in the last month it should be prohibited on account of the danger of infection, in case labor should come on soon afterward. The woman should also be told to report at once to her physician in case of unusual pain, bleeding or discharge of any kind, as these may be the symptoms of a beginning miscarriage.

Toxemia.—Since toxemia is so grave a complication, the patient must also be urged to report any symptoms which

may be connected with it; headache or blurred vision, dizziness, epigastric pain, nausea or vomiting (if more than the slight "morning sickness" and particularly in the later months after that symptom should have passed), scanty urination or edema.

Maternal Impressions.—One of the things which causes the greatest anxiety to some women at the time of pregnancy is the fear that the child will be "marked" or malformed in some way, on account of some experience through which they have passed, especially if it has been a sudden shock or fright. There is practically no basis for such a belief, and the nurse should always do her best to allay such fears and show the mother that they are groundless.

Prenatal Care.—Just as in every branch of medicine the stress is now being laid on the preventive side, so in obstetrics within late years a great effort has been made to develop that side of the work by giving the prospective mother every care throughout her pregnancy. As cases have been more carefully studied, it has been more and more clearly shown that many of the difficulties and dangers of obstetrics can be avoided or at least decidedly lessened, if they are recognized early enough to receive the right treatment at the right time.

Without going into the details of all the possible complications, it may be stated that the chief conditions which threaten the welfare of mother and child are somewhat as follows:

1. Interruption of pregnancy before full term; miscarriage or premature labor.

2. Disproportion between the child and the pelvis, due to the small size or deformity of the pelvis or the large size of the child.

3. Abnormal positions of the child in the uterus.

4. Toxemia, convulsions and kidney disease.
5. Venereal disease.
6. Hemorrhage.
7. General poor physical condition of the mother, as from malnutrition, overwork, tuberculosis, heart trouble, etc.

It is most interesting to see how many of these dangers can be controlled when the patient is kept under observation and given intelligent prenatal care. If she consults a physician at the beginning of her pregnancy and receives careful directions as to her mode of living, with special emphasis on the possible causes of miscarriage, she is far more likely to avoid such an accident. If she has a small pelvis, this will be discovered when her measurements are taken, and while nothing can be done to change the condition of her pelvis, the physician, being "forewarned, forearmed," is prepared to treat the case as may be wisest, sometimes by inducing labor before term, sometimes by performing Cæsarean section at term. Moreover, by seeing the patient regularly throughout her pregnancy he can watch the growth of the fetus and thus know what to expect at the time of the delivery. If a malposition is found, in many cases it can be corrected by external manipulation. The examination of the urine and the estimation of the blood-pressure give valuable information as to a beginning toxemia or the presence of any disease of the kidneys. Syphilis is detected by the Wassermann test and gonorrhea by the microscopical examination of a smear taken from the cervix. When found, they can be treated, and in the case of syphilis, if the treatment is started early enough, it affects not only the mother but the fetus as well and may actually prevent it from acquiring the disease. Tuberculosis and heart disease are found when a physical examination is made; they can be treated and the influence of pregnancy on their progress carefully noted.

Women suffering from malnutrition can be built up physically. Overwork is harder to remedy, especially among the poor, but the social-service worker will often find a solution of the problem. In short, there remains only hemorrhage which cannot be influenced by prenatal care, and even that will be far better treated if taken in time.

Organization of a Prenatal Clinic.—Prenatal work is fast becoming a specialty for nurses, particularly for those whose interests lie along the lines of social service. An outline of the organization of a prenatal clinic and its work therefore deserves a place in a book on obstetrical nursing.

It is taken for granted that any patient who applies at the clinic for care will be questioned by the social-service worker as to such matters as her home conditions, family and finances. In the more strictly medical part of the record the aim is to get information which will be of value in the management of her case. If the woman has had other pregnancies, inquiries should be made as to complications during pregnancy, labor or the puerperium, the size of the children, and their condition at birth, difficult or operative deliveries and if possible the cause of the difficulty. Miscarriages and stillbirths should be carefully noted. It is important to know whether the mother has been able to nurse her babies and whether she has ever had breast abscesses. It is also of interest to note whether in her previous pregnancies she was under the care of a clinic, a private physician or a midwife. All these data will help the doctor to judge what may be expected in the case.

The first point in the history of the present pregnancy is the date of the last menstruation, in order to get an idea of of the expected date of confinement. If quickening has occurred, the time when it was first noticed may help in the calculation, especially if the menstrual history is unsatis-

factory. Nausea, vomiting and constipation should be noted and particular inquiries should be made into any symptoms pointing to any beginning toxemia, such as headache, blurred vision, edema of the feet, hands and face and scanty urine.

The examination of the patient will include the usual physical examination of the heart and lungs; an examination to establish the diagnosis of pregnancy, if that be necessary; the measurement of the pelvis; palpation to determine the position of the fetus and the probable duration of the pregnancy; an examination of the vulva to discover the presence of edema, varicosities and former perineal lacerations; a vaginal examination if the case requires closer investigation. A smear of any discharge from the cervix should be made as a routine at a clinic patient's first visit, and the blood taken for a Wassermann test. At every visit the blood-pressure should be taken and a specimen of urine obtained for examination.

The nurse's share in the examinations will depend on the doctor in charge of the clinic. In any case she must have in readiness the instruments and supplies which are likely to be needed, including a pelvimeter for the pelvic measurements, a speculum, dressing forceps, applicators and sterile glass slides for taking the cervical smear, the blood-pressure apparatus, the necessary sheets and towels for draping the patient during the examination, a stethoscope, sterile hand brushes, green soap (or whatever liquid soap the physician may prefer), an antiseptic solution (bichloride, lysol, alcohol, or whatever the physician is in the habit of using) and sterile gloves for the internal examination, cotton balls, etc., for washing up the patient and the necessary syringes, needles and tubes for the Wassermann outfit.

If possible, three rooms should be devoted to the clinic: a waiting-room, a room for the history-taking and an exam-

ining-room. It is most undesirable for the waiting patients to hear one another's symptoms or see others being examined. If the clinic is a large one, two or more examining-tables can be arranged, according to the number of patients, and separated by sheets hung from screens so that the tables are contained in cubicles. Each patient thus has a certain amount of privacy and can dress and undress in her cubicle without the need of an extra dressing-room.

The examining-room should contain a sink or basin with hot and cold water, where the physician can scrub his hands, and a place for boiling gloves and instruments, in case the sterile supplies run short.

As it is probable that the physician in charge will want someone to help in taking the blood-pressure and getting the blood for the Wassermann tests, the nurse will do well to learn the technic. In many clinics the nurse also makes the routine examinations of the urine, except perhaps the microscopical examination. If she is wide-awake and helpful, she can train herself to be a valuable assistant.

It is of the greatest importance that the patients should visit the clinic at regular intervals, so that their progress can be carefully followed. The frequency of the visits is set by the head of the clinic and will naturally vary according to the individual opinions. One visit a month is usually enough up to the end of the fifth month; after that twice a month or every two weeks, increasing to once a week in the last two months, when symptoms of toxemia are especially apt to arise. At some clinics a uniform interval of two weeks throughout pregnancy is the rule. The patient is directed to report at once any untoward symptoms, especially any which would point to a beginning toxemia or miscarriage.

Since most of the women who attend such clinics are too busy with their household cares to make the frequent visits

as above outlined, and find it hard to see the need of coming so often when they are feeling well, one of the duties of the prenatal nurse will be to pursue them to their homes and persuade them to visit the clinic. If it is really impossible for them to attend regularly, she will visit them herself at the stated intervals, bringing away a specimen of urine and taking the blood-pressure each time, inquiring into their general condition and making any examination which the doctor may direct. If she finds anything out of the normal, she must insist on their consulting the clinic physician.

Postnatal Clinics.—It sounds rather like an Irish bull to say that one of the important parts of a prenatal clinic is postnatal work, but such is nevertheless the case. All the obstetrical skill in the world has been of little avail in saving a child's life, if it is left to the care of an ignorant mother after its birth and no attempt made to keep it well. Patients who have received prenatal care and have been carried safely through confinement should be urged to report back to the clinic with their babies a month after delivery, so that directions can be given them as to the care of the babies and themselves. After that they should be kept under observation by visits to the clinic at stated intervals, so that the babies can be weighed, their progress observed and their feeding and general care supervised.

Such a well-babies' clinic is of the greatest value in teaching the mothers how to care for their children and is another step in preventive medicine in obstetrics. At the first visit and probably the second as well the mother should also receive an examination, and if there remains any condition which needs treatment, that should receive attention at the proper clinic. Infant welfare is receiving great emphasis at the present time, and rightly enough, but maternal welfare deserves its share too.

CHAPTER V.

MANAGEMENT OF LABOR.

Preparations for Confinement in a Private House.—Arrangements for a confinement in a private house are of necessity distinctly different from those in a well-equipped hospital, and the nurse's ingenuity and powers of organization will often be put to the test. This is particularly true in such work as an out-patient obstetrical service, since the homes of the patients are often devoid of all conveniences. Nevertheless, the prenatal nurse can accomplish wonders by looking over the ground beforehand and making the most of what can be obtained.

The nurse who is to take charge of a private case of this sort should make a point of visiting the home before the appointed time, since in this way she can familiarize herself with the arrangements of the house and the location of the kitchen, bath-room, etc. She may also be able to give helpful suggestions as to the choice of the room in which the patient is to be confined, the best way of arranging the furniture and the various other preparations which the patient will wish to make. More than this, she makes the acquaintance of her prospective patient, so that she does not enter the house as an utter stranger at the time of the confinement, a point which counts for much.

The room in which the patient is to be confined and in which she will spend the first weeks of the puerperium, should be the brightest and most cheerful in the house, well

lighted by artificial light and conveniently near a bath-room. It is neither necessary nor desirable to transform it into a hospital operating-room, with bare walls and white enameled furniture; on the contrary, it should be as home-like and pretty as possible, since surroundings have more effect on patients than we always realize. Nevertheless, the nurse must see to it that anything that might be spoiled by the spilling and spattering which necessarily occurs at the time of the delivery is temporarily removed. People are prone to resent damage done to their property, and the remembrance of the faithful and devoted service of a nurse in a time of great emergency suffers, if it is called to mind by spots on the carpet or wall-paper, ruined varnish and the like. For the time of the confinement rugs should be taken up; if there is a carpet on the floor, this must be covered in the region of the bed by laying down a piece of oilcloth (newspapers will serve, if nothing else is at hand). Any bureau or table on which obstetrical supplies, medicines or solutions are to be placed, must be protected with enamel-cloth, oil-cloth or the ever-to-be-depended-on newspapers. Poor families can be instructed to save old papers for the event, so that there will be a goodly supply on hand. We must not forget that in even the poorest home there will be treasures which must be kept from harm, although they may look like the veriest rubbish to us.

The bed must not be tucked into a corner, if this can possibly be avoided, but should have only the head against the wall, thus allowing access to both sides of it and free passage around it. It should be the highest bed in the house, for the sake of the doctor and nurse, who will work at a disadvantage, if they are continually stooping in the course of their care of the patient; moreover, a high bed makes an operative procedure much easier. If there is no

high bed available, a strong, steady table, such as an ordinary kitchen table, should be provided in case of any operation. A defect common to most beds is that they are too soft, so that the woman soon slips down into a hollow, from which it is impossible to drain off any fluid or discharge and in which it is difficult for the obstetrician to do his work. It is usually possible to support the mattress by firm boards placed underneath it; an ironing-board will answer the purpose satisfactorily. The boards must, of course, be removed after the delivery, as they will make the bed too hard and uncomfortable to lie on for any length of time.

The arrangement of the bed is familiar to most nurses. First, the mattress is covered with a piece of rubber sheeting or oil-cloth, which is large enough to hang well over the edge or even to be tucked under it. Over this is spread a full-length sheet, carefully tucked in all around. A second piece of rubber sheeting, about half the length of the mattress, is covered with a draw-sheet and laid over the middle of the bed, where it will be beneath the patient during the delivery; it can be removed afterward, leaving the clean permanent-bed arrangement underneath. In addition to these, bed-pads should be provided, which can be changed as they become soiled during the labor. These can be made of the quilted padding which can be bought at any shop, or a home-made variety may be devised with layers of brown paper or newspapers covered with old muslin. They can be eked out with "clean rags" which dispensary patients should be urged to save for the occasion. In a hospital a Kelly pad, covered with a sterile sheet or towel, is usually placed under the patient at the time of the actual delivery. This is not as satisfactory for home use, because it is so hard to clean and sterilize the rubber pad. A similar contrivance can be made out of newspapers, rolled like the

edges of the Kelly pad, and covered with muslin. A clean pail is placed beside the bed, so that it receives the water and other material which drains away from the field of operation. As already stated, the floor beside the bed must be protected with oil-cloth or paper. The bed is made up so that it opens at the right side, since the obstetrician will take up his position at this side. A chair is placed beside the bed for his use, as he will not wish to stand all the time.

At the head of the bed, and better at the left side, where it will not interfere with the obstetrician, is a table with the outfit for the anesthetist. Two other tables will be needed, one for the solutions for the doctor and the other for the sterile supplies, cord instruments, etc. The bureau or dresser will serve in place of the latter, if need be, but it is usually occupied by the extra supplies, medicines, hypodermic outfit and such things, which must be at hand in case of need, but are not necessarily required in a normal delivery. Another part of the room is reserved for the baby's basket. A baby's bath-tub and a large basin (a dish-pan is about the right size) should be ready to hold the hot and cold water, in case the child needs to be resuscitated. In a hospital two small tubs are provided for this purpose. The outfit for giving an intra-uterine douche, ready sterilized, must be near at hand for use in case of hemorrhage. Plenty of sterile water, both hot and cold, is indispensable.

The Hospital Delivery-room.—The appointments of the delivery-room in a well-conducted hospital are in general the same as those of the operating-room, and the same rules of rigid aseptic technic hold sway. The room should be always prepared to receive any sort of emergency case. The sterile hand-brushes and soap are in covered containers on the sink. The antiseptic solution and sterile water for soaking the hands and arms after scrubbing are best kept

not in basins but in deep jars of glass or agate in which the arms can be easily immersed as far as the elbows; these are covered when not in use. A movable stand with two basins is also provided. At the time of the delivery they are filled with fresh sterile solutions and the stand is wheeled near the bed within easy reach of the obstetrician. The solutions for washing off the patient (liquid soap, sterile water and the antiseptic of choice) are ready in well-stoppered flasks. The catheterizing-tray must not be forgotten.

FIG. 58.—Hospital delivery-room showing anesthetist's table, intra-uterine douche outfit, baby's crib and tray for treating eyes. At the extreme left may be seen tables with sterile supplies and stand with basins.

The supplies required for a normal delivery may be wrapped in a sheet and the whole bundle sterilized; it is then placed unopened on a table. This sterile pack will contain two surgeon's gowns, head-gauze or cap, mask, two pairs of gloves, two sheets, one pair of leglets, at least six towels, plenty of gauze squares or sponges, the cord instruments, tape and dressing. Ready sterilized in separate

packages are the instruments for repair of lacerations (both cervical and perineal) and two pairs of obstetrical forceps (high and low). On a small table beside the baby's crib are the solutions, eye-droppers and other things for treating the child's eyes. Reference has already been made to the small tubs used in the resuscitation of the infant. The anesthetist's table should be well stocked with the necessary articles. An oxygen tank, easily accessible and surely full, is essential.

Since hemorrhage is so grave an obstetrical complication and since, moreover, it may come on without the least warning, it is vitally important to have at hand, ready for use without a minute's delay, whatever may be needed to meet this emergency. The outfit for the intra-uterine douche (container, tubing and nozzle) is hanging from its standard, sterilized and carefully covered. Several rolls of uterine packing of various widths (mostly from four to six inches) are close at hand. It may even be thought wise to include a few rolls in the sterile pack. A rectal tube and a hypodermoclysis outfit are conveniently accessible and sterile normal salt solution must be kept in stock. An absolutely necessary part of the equipment of every delivery-room is the hypodermic tray, which should contain two *tested* syringes and half a dozen needles (also tested). Besides the usual collection of drugs for hypodermic administration ergot and pituitary extract in sterile ampoules are all-important.

Internal Examinations during Labor.—As a general rule the physician is the one to make internal examinations during labor, but as some doctors wish the nurse to be trained to aid in this way and as certain emergencies may require it, the nurse will do well to learn how such an examination is made and what is to be learned from it.

Internal examinations are either vaginal or rectal. Since the former are in far more common use and offer the easier

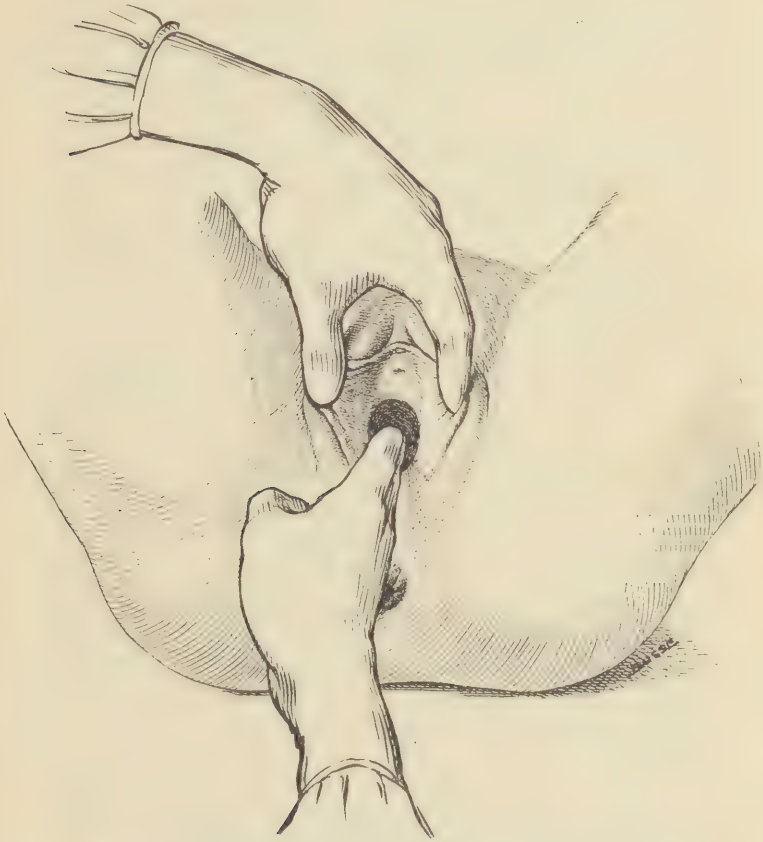

FIG. 59.—Method of making a vaginal examination. (Cragin.)

method of determining the conditions present, they will be described here. It is claimed that the use of rectal examinations will greatly reduce the danger of puerperal infection,

since they afford no possible opportunity of carrying infection into the uterus. The preliminary cleansing of the hands and parts is thus unnecessary, and a glove is worn only for the protection of the hand from contamination by the contents of the rectum. It must be remembered, however, that extra care must be taken in sterilizing the gloves afterward, as the colon bacilli which live in the rectum seem to be particularly resistant organisms. In point of fact, infection from vaginal examinations is little to be feared if aseptic technic is scrupulously observed.

Hand disinfection and the preparation of the patient for a vaginal examination have already been described. It must be borne in mind that the vulva can never be rendered as sterile as the hand and that in making an examination we must as far as possible avoid touching the vulva with the hand which is to be introduced into the vagina. For this reason the labia are separated and the vaginal introitus spread wide open with the fingers of the left hand while two fingers (the index and middle fingers) of the right hand are gently slipped into the canal. If the patient is not yet past the first stage of labor, the fingers must be carried obliquely downward and far back to reach the cervix. If the head has begun to descend, the fingers may come in contact with it if introduced horizontally.

The chief points to be noted in a routine examination are as follows:

1. The cervix; its consistency and the amount of dilatation.
2. The membranes; whether intact or ruptured.
3. The presenting part; whether head, breech or small part; whether movable above the superior strait or firmly fixed and descending through the birth canal; whether turned anteriorly or posteriorly.

The dilatation of the cervix is usually measured in fingers'

breadths. The examiner inserts the two fingers into the external os and by separating them, estimates how many fingers could be introduced. Some prefer to compare the amount of dilatation to the size of a coin, as a quarter or a dollar. As the dilatation proceeds, the cervix rolls back from the presenting part until the edge can barely be felt, and the dilatation is then complete.

The membranes can be felt like a tense sac bulging through the os, when the patient has a pain; between the pains they are more difficult to identify. In a doubtful case it is better to examine during a pain. If the membrane is applied very closely to the presenting part, it is hard to tell whether the sac has ruptured or not. If the head is the presenting part, the hair can be felt after the membranes have ruptured. Sometimes the fluid, with flakes of vernix, can be seen oozing from the vagina.

The head is distinguished from the breech by its rounded shape and its hard consistency. It may be possible to feel the sutures and fontanelles, if there is sufficient dilatation and the head is not too high. After the rupture of the membranes the difference is more easily made out; if the breech is presenting, the anus can then be felt, and the meconium escaping from it confirms the diagnosis.

Various abnormal conditions are revealed by a vaginal examination. The most important of these are a prolapsed cord and placenta previa. The cord is recognized by its pulsation; the placenta is felt as a soft mass protruding into the cervix and perhaps covering the presenting part. The early discovery of these complications may mean the saving of life.

Management of the First Stage of Labor.—As soon as it is decided that labor is definitely under way, it is routine to give the patient an enema and a bath. The former procedure

should be carried out in practically every case, unless the patient is too far advanced in labor when first seen. If a woman is allowed to go through labor without having her lower bowel thoroughly emptied, one of two things is likely to happen, if not both. Either the mass of fecal matter will obstruct the full stretching of the vagina, or some of it will be squeezed out with each pain during the descent of the head through the lower vagina, soiling the obstetrical field of action and perhaps bringing infection. It is, moreover, extremely disagreeable to the patient to have the additional discomfort of feeling the bowels move during the birth of the child.

The bath is often omitted in the case of private patients, but it may be sadly needed in hospital and out-patient practice. In any case the vulva, thighs, buttocks and lower abdomen should be thoroughly cleansed with soap and water, and the vulva further cleansed with an antiseptic solution such as bichloride of mercury (1:2000) or lysol (1 per cent solution). If a bath is given, the greatest care should be taken to prevent the water from entering the vagina, since it may carry infection. It is therefore better not to let the patient sit in the water. A gentle shower may be used, water may be poured over the patient as she stands in the tub, or a simple sponge bath may serve all purposes.

Hospital routine usually includes the shaving of the pubic hairs, especially where they run back along the sides of the vulva, since it is quite impossible to make the hairs aseptically clean, and moreover, blood, vaginal discharge or fecal matter may cling to them and serve as the starting-point for an infection. In country or dispensary practice it is not always practicable to have the parts shaved, but at least the hairs about the vulvar opening can be clipped short with scissors.

It was at one time the custom to give an antiseptic vaginal douche as part of the preparation for labor, with the idea that the solution would destroy any bacteria which might have entered the vagina. While some physicians may still follow this routine, the general consensus of opinion now is that a douche should not be used, as it probably does more harm than good by washing out the vaginal secretion which is the natural protection against bacteria, as well as possibly carrying organisms in from the vulva on the douche nozzle. The only exception to this rule is in the case of a gonorrheal discharge. Since the vaginal secretion has no effect on the gonococcus, no harm is done by removing it, and the douche, by washing out the discharge and cleansing the vagina, may prevent the child's eyes from being infected during the birth. A nurse should never give a douche without a doctor's order.

After the patient has been prepared, she should put on clean underclothes and a loose and comfortable dressing-gown, and try to occupy herself in some way so as to take her mind off herself. It is a great mistake to put a patient to bed at the beginning of the first stage of labor, for the pains are not as effective when she is lying down and she grows tired of the bed before the second stage, when she should be kept there. Patients who have been put to bed too early often become restless and insist on getting up during the bearing-down pains. Toward the end of the first stage the woman is usually more comfortable in bed. Before she goes to bed her hair should be braided in two braids; this can be done as a part of the preparation, if desired.

Management of the Second Stage of Labor.—As soon as the second stage of labor has begun, the patient is put to bed, and not allowed to get up again for fear that the child may be expelled unexpectedly. Even though she wishes to get up

only for the purpose of going to the toilet, this must not be permitted and a bed-pan must be used instead, as the somewhat squatting position and the straining efforts of moving the bowels may push the child out before she realizes what is happening. Many cases are on record in which the baby was born in this way, through sheer accident, and not a few in which the mother has attempted to conceal the birth of the child or destroy its life by letting it be born in a privy or water-closet. It may be necessary to watch very carefully a woman who is illegitimately pregnant, although it is only fair to say that in most cases she is ready to go through the ordeal bravely enough, however hard the circumstances may be.

It is usual to have the patient lie on her back throughout the second stage of labor, although some obstetricians prefer to have her turned on her side at the time of the actual delivery. This means that she will be kept in one position from one to three hours in many cases, and it is not to be wondered at that she becomes cramped and uncomfortable and suffers from backache which may annoy her almost more than the pains themselves. It is true that the dorsal position makes it easier for the woman to use her abdominal muscles in bearing down, but she may certainly be allowed to take other positions, turning from side to side between the pains, and while she is on her side the nurse has a chance to make her more comfortable by rubbing her back. If the patient lies for a long time with her knees flexed, she may be troubled with agonizing cramps in her legs; these also are relieved by a change of position and rubbing. She is likely to become very weary from the repeated straining, and if the room is warm, as it is so often the case in a hospital, she may be almost bathed in perspiration, while her mouth and lips become dry and parched. A thoughtful nurse will

watch her patient and see that her face is sponged off with cool water. If it is not practicable to give her something to drink, because an anesthetic is to be used, she can at least moisten her lips and rinse out her mouth. Any little attentions like these make a great difference in the comfort of the patient and help her in going through the strain of labor.

When the pains come, the patient should be encouraged to make the best use of them in every way. Some women, particularly if it is their first experience, actually do not know how to bear down in the most effective way, and must be shown or aided. It is often a help to have something to pull on, and the first instinct of the patient is to grasp the hand of the nurse or any other person who may be at the bedside, but as this is fatiguing to all concerned, it is better to arrange some mechanical contrivance. Straps with handles are used in most hospitals, but where these are not available, a very satisfactory substitute can be made with a twisted sheet passed around the foot of the bed. It must be carefully explained to the patient that she must bear down only during the pains, as she will sometimes keep on straining after the pain is over, accomplishing nothing and only wearying herself needlessly. As the head begins to emerge from the vagina she should be told to take short breaths and not push hard, for a strong bearing-down pain at this point may send the head out so suddenly and with such force that a bad laceration is the result. The use of an anesthetic, to relax the patient as well as to save her the last severe pains, is well worth while.

Posture.—The position of the patient during this stage deserves special consideration. When the head is slow to engage or pass through the superior strait, a posture is used which makes more room for it by opening the pelvic inlet a little farther. This is the Walcher position, in which the

woman's hips are brought to the edge of the bed and the legs allowed to hang over it. It has the disadvantage of being so uncomfortable that the patient cannot long remain in it, but it can be repeated at intervals.

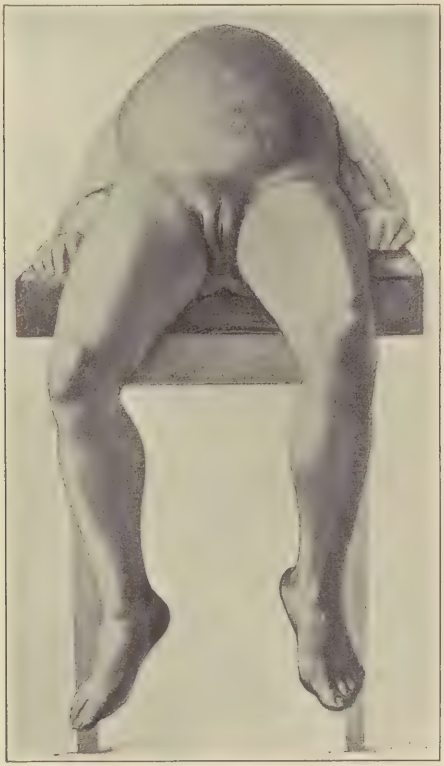

FIG. 60.—Walcher position. (Bumm.)

Among primitive peoples the woman squats on the ground during the second stage of labor, because in that position the abdominal muscles can be used to the best advantage, with the knees pressed against them and reinforcing their

action. We have long since adopted the idea that a woman should be in bed at the time of her delivery, yet we must try to utilize the principle of the squatting position to make the pains more effectual. This we do by placing her on her back with her knees flexed, when she is having the expulsive pains. When the head has reached the pelvic floor, its expulsion is made easier if she takes the lithotomy position, with the thighs flexed on the abdomen. This corresponds more nearly to the squatting position, and moreover it increases the size of the pelvic outlet a little, just as the Walcher position increased the inlet.

During the actual delivery the patient lies either on her back or on her side, according to the preference of the obstetrician. When she is on her side she cannot bear down as well as in the dorsal position, and this is sometimes an advantage, when there is danger that the head will be expelled too rapidly. It is routine with some physicians to deliver primiparæ in the lateral and multiparæ in the dorsal position.

As the head pushes down lower in the pelvis, it makes pressure on both the urethra and the rectum, through the vagina. Sometimes the pressure prevents the emptying of the bladder, which may become so full that it bulges above the symphysis like a tumor and in neglected cases reaches almost to the umbilicus. There is always danger in such overdistention of the bladder, but in an obstetrical case there is the special difficulty that it will act as an obstruction to the passage of the child's head. If the patient cannot void her urine, she must be catheterized, and the result is often to shorten what seemed like a serious delay in the second stage of labor. The nurse should be on the lookout for this complication and report to the physician when it occurs. If a patient must be catheterized during labor, a rubber catheter should be used, because a glass one may be broken in the attempt to push it past the head.

If the patient has not had an enema, feces may be squeezed out of the rectum at this stage of the process. If this happens, the material must be carefully wiped away and sterile gauze or a sterile towel laid over the anus. In any case the opening will bulge until the mucous membrane is easily seen, as in a case of prolapse of the rectum. If the pressure continues too long, hemorrhoids sometimes result.

In the average case the doctor is called as soon as the second stage begins. It is, therefore, a matter of importance for the nurse to learn to recognize the change in the character of the pains which ushers in this stage. It is not enough to wait for the rupture of the membranes, for while in many cases this does occur at the end of the first stage, it may also be delayed until just before the child is born or, as is well known, the baby may even be born in the unruptured membranes or caul.

The physician should always be informed of the rupture of the membranes, however, whether this comes early or late, since the cord may slip down with the gush of fluid, giving rise to one of the most serious accidents of labor. If the physician is at hand, he will usually examine after the escape of the fluid, to assure himself that this has not happened. If he is not within reach, the nurse will do well to listen frequently to the fetal heart, since pressure on the cord is shown by failing heart tones. The treatment of this complication will be described later.

If the nurse is left in charge of the case in the doctor's absence, with instructions to report to him, she should ask for most explicit directions concerning what she is to report and when. In every case it will be her duty to watch the condition of both mother and child, and to notify the obstetrician if things are not going well. It is equally important to report slow, nagging, ineffectual pains and those which

are too violent, since both types are exhausting to the patient. The character and rate of the mother's pulse are a reliable guide to her condition; a pulse of over 100 between the pains is too rapid. Danger to the fetus is shown by weak, irregular heart beats, growing either fast or slow. The passage of meconium must always be reported at once, since it means either a breech presentation, which the nurse should not be expected to handle alone, or beginning asphyxia of the child.

When the physician is in the house, especially if the case is lasting into the night, he will often ask the nurse to watch the patient while he rests, and to call him in time for the delivery. Under these circumstances it is customary to wait until the descent of the head is shown by the separation of the labia and the opening of the introitus with a pain, the bulging of the perineum and the protrusion of the rectum. The advance of the head can also be ascertained by palpation through the perineum, with the patient in the dorsal position.

As soon as the nurse has notified the obstetrician, she will get everything in readiness for the delivery. The patient is placed in the dorsal or left lateral position, according to the doctor's order. The vulva is once more carefully cleansed, the sterile leglets are drawn on, a sterile sheet or towel is laid beneath her and another across her abdomen. Sterile sponges or squares of gauze and sterile towels are laid within the reach of the obstetrician, also the cord instruments, the bobbin and the cord dressing. Meanwhile the physician has been scrubbing up, and will be ready to put on the sterile gown, cap and gloves with the nurse's assistance. As soon as he has assumed charge of the patient, the nurse will be free to see that everything is ready for use at a moment's notice. These last preparations will include the arrangement of the baby's basket, with a hot-water bottle; the

outfit for the intra-uterine douche; a sterile hypodermic syringe; the droppers and solutions for the eyes; and whatever might be needed for the resuscitation of the child.

Management of the Delivery of a Normal Case.—There are so many chances of an unexpectedly sudden delivery before the arrival of the physician that a nurse who intends to take many obstetrical cases should make herself familiar with the management of a normal delivery, in order to be able to act in an emergency.

When the head reaches the pelvic floor, it will be noticed that the labia begin to separate a little at the height of each pain and that there is slight bulging of the perineum. This separation becomes more marked and the vagina then begins to gape open with the pains, until little by little the head appears, only to recede as the pain subsides. After arranging the patient for delivery as has been already described, the nurse disinfects her hands and puts on a sterile gown and sterile gloves. She then takes her place at the right side of the bed, with sterile towels and gauze and the cord instruments within easy reach.

There are two points to be remembered in the management of the delivery: (1) That the head must be prevented from passing through the vaginal opening too fast, in order to guard against perineal tears; and (2) that the birth must not be so delayed as to endanger the life of the child. The simplest method of protecting the perineum from laceration is to hold the left hand firmly over the vaginal orifice and press against the head as the pain drives it down, letting it advance only enough to dilate the vulva a little each time until the opening is large enough to let it come through. With the right hand pressure is made through the perineum, to help the extension of the head. While the head is actually emerging, the patient must not be allowed to bear down

too hard, lest a sudden expulsive movement send the head out before it can be controlled. If no anesthetic is available, the patient should be directed to take short, panting breaths, so that she cannot strain with so much force.

FIG. 61—Head under control. Patient deeply anesthetized for a few moments. The towel in the photograph has been allowed to slip back to show the position of the anus. In practice the lower gloved hand should be covered with a sterile towel. (Cragin.)

As soon as the head is born, the nurse will feel for the cord, as it is not at all uncommon to find it around the child's

neck. If there, it should be slipped over the head, so that there will be no danger of its being drawn tight about the neck while the birth is being completed. Sometimes there are two or three coils, or even more. When the cord is so close about the neck that it cannot be brought over the head, it may be necessary to clamp it in two places and cut between the clamps, if it is interfering with the delivery. When the head begins to swing around so that the occiput is turned to the side, it is a sign that the shoulders are about to rotate, and that they can be extracted. The patient may be allowed to bear down gently to bring the shoulders to the vulvar opening, but if she cannot control her movements, it may be better to extract them between the pains, to avoid tearing the perineum. The child's head is grasped by the chin and the occiput, and drawn downward, to bring the anterior shoulder close under the symphysis, and the posterior shoulder is then guided out over the perineum. When this has emerged, the anterior is allowed to slip out, and the whole body will follow easily. Occasionally the shoulders are so firmly wedged (impacted, is the obstetrical term) that considerable force is necessary to dislodge them, and it may even be necessary to make traction in the axilla in a difficult case, but this should be avoided, because of the danger of causing paralysis of the arm from pressure on the nerves.

Anesthesia in Labor.—There are still people who hold to the old idea that a woman must bring forth her children in sorrow, and that no effort should be made to assuage her sufferings, and occasionally women will refuse the relief afforded by an anesthetic on account of their religious beliefs; but the general practice of our modern days is to use an anesthetic as a routine, at least in the second stage, unless the labor is short or the pains not severe. It has already

been stated that its use not only spares the woman much suffering but also shortens the process of labor and lessens the danger of lacerations by relaxing the muscles and other tissues.

In the first stage of labor, when the pain is intense and the dilatation slow, other means are used for this purpose. Opium, either as a suppository ($\frac{1}{2}$ to 1 gr.) or in the form of morphine by hypodermic ($\frac{1}{6}$ to $\frac{1}{4}$ gr.), is in common use, and chloral, 15 to 20 gr. (given in milk, by rectum, on account of its irritating qualities) is an old and tried remedy. The anesthetics in use at the present time are:

1. Chloroform.
2. Ether.
3. Nitrous oxide and oxygen.
4. Scopolamin and morphine.

Chloroform.—Chloroform as an anesthetic in labor was introduced by the English obstetrician, Simpson, and because he used it when in attendance on Queen Victoria, this method of relieving the pain of labor has been called confinement "à la reine." For some reason it is a more popular anesthetic abroad than in the United States, and in this country it is more often used in the south than in the east and north. It is true that as a general anesthetic chloroform has certain dangers, but as administered in obstetrical cases it is safe enough, because the patient is kept under its influence for so short a time and gets enough air for safety. The method of administration is to pour a few drops on an Esmarch inhaler (or on a piece of folded gauze) just at the beginning of a pain and let the patient breathe it in until the pain is over. With the suffering dulled in this way the woman bears down more effectively and the parts become relaxed. Between the pains she receives none of the anesthetic until just as the head is passing over the perineum, when the

anesthesia may be deepened so that she is unconscious at the moment of the delivery. It is seldom advisable to give chloroform before the second stage.

Ether.—Ether is administered in much the same manner as chloroform, but its action is not as rapid and more is needed to bring about the desired result. If too much is given, the contractions may be interfered with and the patient cannot bear down as well. The danger of having ether near an open flame must never be forgotten. Ether is probably the most commonly used of the above anesthetics, at all events, in this country, and it is the anesthetic of choice for obstetrical operations. In such cases the patient is anesthetized as for any other operation. Although the anesthesia must be deep enough to relax the patient thoroughly, it is a common experience to find that less ether is needed for obstetrical operations, probably because the woman is tired from the strain of labor and is therefore more easily brought under the influence of the anesthetic.

Nitrous Oxide.—Nitrous oxide, the familiar "laughing gas" of the dentists, is not a satisfactory anesthetic unless mixed with oxygen. This combination has been suggested as effective and safe in obstetrical cases and excellent results have been reported. It is not widely used on account of the somewhat cumbersome apparatus, which cannot be easily carried outside of a hospital, and its expense. Like ether and chloroform, the gas is given with the pains, to relieve the patient's suffering without rendering her unconscious; unlike them, it can safely be begun during the first stage. It should be administered only by a trained anesthetist.

Scopolamin-morphine.—The scopolamin-morphine method is better known by its popular name of "twilight sleep." It is also called the Freiburg method, because its technic was

perfected at the hospital there by Krönig and Gauss. In spite of the widespread publicity which it received a few years ago, it is not regarded with favor by most obstetricians in this country, although it has some enthusiastic and firm adherents. It should really be called amnesia rather than anesthesia, because the result of the treatment is loss of memory of the pain suffered and not actual abolition of the pain, although this is somewhat lessened. The patient often has all the appearance of great suffering, perhaps becoming very restless or even violent or delirious, and it is hard to believe that the experience is not being impressed upon her mind.

While the success of the method depends largely on its adaptation to each individual case, according to the conditions which may arise, the technic in general may be described as follows. After the first stage of labor is well established, with the pains coming not more than five minutes apart, the patient receives a hypodermic injection of morphine (gr. $\frac{1}{6}$) and scopolamin (gr. $\frac{1}{200}$). Three-quarters of an hour to an hour later a second dose is given, but this time the morphine is omitted and only $\frac{1}{400}$ gr. of scopolamin is used. This is repeated in about an hour. After this the dosage is regulated by the patient's condition. The idea is to keep her sufficiently under the influence of the drugs to be oblivious to what is going on about her, without becoming actually unconscious. Certain tests of her memory are tried from time to time, so that the physician may know when it is necessary to repeat the injections. In order to heighten the effect of the drugs, the room is darkened and kept absolutely quiet and the patient's eyes may be covered. The obstetrician must be almost constantly in attendance.

It can be easily understood that this method is one which requires the greatest care in the administration of the drugs

and the most watchful observation of the patient. As an overdosage is likely to cause asphyxiation of the child, the fetal heart must be frequently counted and all preparations must be ready for an operative delivery, should signs of danger arise. The baby is often born in a condition called oligopnea, in which it makes no effort to breathe, although it is not in a state of true asphyxia. The method must be set down as dangerous except in the hands of those specially trained in its technic.

The nurse's part in obstetrical anesthesia may be an important one, as she is often asked to give the chloroform or ether. Unless she is a trained anesthetist she will not be expected to administer nitrous oxide, and "twilight sleep" is always directed by the obstetrician.

Care of the Newborn Child.—As soon as the baby is born, if it is breathing well, it is laid on its right side between the mother's feet, to wait until the pulsation in the cord has stopped. If there seems to be much mucus in its throat, the head may be lowered to let it run out more easily. As long as the cord continues to pulsate, we know that blood is passing from the placenta to the child's circulation, and as the quantity of blood may amount to an ounce or two, it is better to let the child have the benefit of this additional nourishment. When the pulsation ceases, the cord is tied and cut.

The umbilical tape or bobbin which is used for tying the cord can be obtained ready-sterilized in envelopes or small glass containers from any surgical-supply house, or narrow tape can be cut into lengths of ten to twelve inches, and sterilized by the nurse beforehand. In an emergency a piece of narrow tape or a strong twisted thread can be used after boiling it or soaking it in an antiseptic solution. The tie is placed one-half inch beyond the skin of the umbil-

icus, and the knot, which *must* be a square knot, is drawn as tight as possible, to make pressure on the vessels through the soft Wharton's jelly. As someone has said, "Tie it as tight as you can, and then a little tighter." To make assurance doubly sure, the ends of the tape should be carried to the other side of the cord and tied a second time. Great care should be taken not to pull on the cord, and in tying it the thumbs should be held close to the knot, to avoid a jerk, if the child should move. Another tie or a clamp is placed about an inch further away from the child's body and the cord is cut between them. Ordinary straight scissors can be used, but special scissors are made for the purpose. Their blades are curved so that they fit around the cord and their points are blunt for greater safety. In any case the child should be protected from any possible injury by laying the back of the hand on the abdomen and letting the cord come through between two of the fingers while it is being cut.

The next step is to scrub off the stump of the cord two or three times with a piece of sterile gauze, watching carefully to see whether there is any oozing from the vessels. If none is seen, the stump is swabbed with alcohol and a sterile gauze dressing applied, with a sterile abdominal band outside of it. The dressing consists of a few layers of square gauze, slit to the center on one side, so that it can be folded about the umbilical stump. Sometimes the cord is passed through a hole in the center of the dressing.

Eyes.—The treatment of the eyes is an important part of the routine care of a newborn baby, because it prevents the development of any infection which may have been acquired from organisms in the mother's vagina. Ophthalmia neonatorum, or gonorrheal ophthalmia, the inflammatory condition of the eyes caused by the gonococcus, is the most dangerous of these infections, and is responsible for so many

cases of blindness that preventive treatment is required by law in some places. An efficacious method now in common use was introduced by Credé, of Leipzig, in 1884.

FIG. 62.—Treating the baby's eyes. The cotton pledgets are omitted to make the picture clearer.

The Credé treatment consists in dropping 1 drop of a 1 per cent solution of silver nitrate into the baby's eyes, following it with free flushing with boric acid solution. The child's head is turned to one side, so that the fluid used in one eye cannot possibly run into the other. The eyelids are held apart with pledgets of sterile cotton, and 1 drop of the silver nitrate solution is dropped into the eye. On account of the possible irritation from the silver solution the eye must be flushed with normal salt solution or boric acid immediately afterward. If the silver nitrate solution is too strong, if too much of it is used, or if the eye is not well flushed afterward, an inflammatory reaction known as

"silver catarrh" is likely to follow. After one eye has been thus treated, the baby's head is turned to the other side and the other eye treated in the same manner, fresh pledgets being used to hold it open. In some clinics one of the so-called organic compounds of silver, such as argyrol (20 per cent) or protargol (10 per cent) is used in place of the silver nitrate. They are less irritating and need not be followed by the free flushing; they are also more expensive.

After the eyes and cord have been treated, the child is wrapped in a blanket and laid in a crib or basket or some safe spot, where it cannot roll off and nothing will be laid on it. The mother's bed is a poor place. A hot-water bottle is put under the baby. This must not be too hot and must not come in contact with the child's skin, and the blanket between it and the child must not be wet. The bottle must be tested for possible leaks before using, and its cap screwed in tightly. Too much emphasis cannot be laid on these points. Failure to observe them has been the cause of serious burns.

As an active infant may become uncovered by moving about, the child should be inspected frequently. In some hospitals the baby is put into a flannel bag before being wrapped in the blanket. As the warmth of the crib sometimes starts an oozing from the cord, the dressing should also be inspected at frequent intervals. The child's color and respiration should also be watched, especially if measures of resuscitation were required. As soon as the mother has received all the necessary attention, and can safely be left alone, the nurse takes charge of the baby again, and oils its body thoroughly to remove the vernix caseosa before bathing it. It goes without saying that every newborn infant should be examined carefully for any malformations or birth injuries.

Management of the Third Stage of Labor.—If the hand is placed on the uterus as soon as the child is born, it will be found that the fundus has sunk below the umbilicus, where it remains while the placenta is separating. If the separation is according to the Duncan mechanism, there will be a slight steady flow of blood from the vagina, which is normal

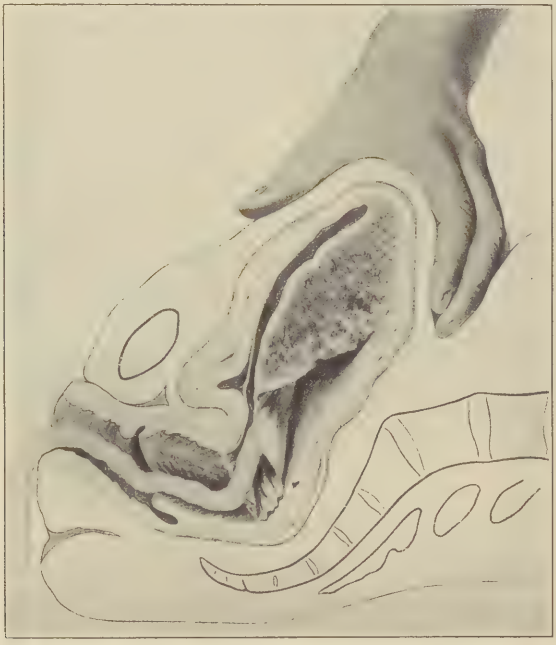

Fig. 63.—Credé or Dublin method of expressing the placenta. (Bumm.)

and should give no cause for alarm as long as no great amount is lost. When the placenta has become detached, the fundus rises to the umbilicus or even above it, and the cord may slip down through the vulvar opening. If the woman has a very thin abdominal wall, a slight bulging above the symphysis may be seen as a sign that the placenta has descended

into the lower uterine segment. It is important to learn to recognize when the separation has taken place, because although the expulsion should be accomplished spontaneously, experience has shown that it frequently requires assistance. If there is no result from the bearing-down efforts of the patient, the fundus should be kneaded a little to insure its firm contraction, and then grasped with the thumb in front and the four fingers behind it; firm pressure is then made obliquely downward in the direction of the pelvic cavity, until the placenta is pushed out of the vagina. This method is commonly called by the name of Credé, but should really be known as the Dublin method, since it was first practised at the Rotunda Maternity Hospital in that city. It must be clearly understood that this procedure is used to express the placenta after it has separated, and not as a means of detaching it.

Whether the placenta is expelled spontaneously or thus aided, a hand must be ready to receive it as it emerges from the vagina, as otherwise it may be pushed out too fast, and by falling suddenly it may tear through the membranes and leave a piece of them behind in the uterus. If, as sometimes happens, the membranes or a part of them remain adherent to the uterine wall or are caught in the cervix, it may be necessary to make slight traction to release them. This is best done by twisting them into a cord, to prevent their tearing when the traction is made. Sometimes gentle tapping on the lower segment of the uterus just above the symphysis will help. The placenta and membranes should always be carefully examined to see that no portion of them has been left behind. They are then placed in the pan or other receptacle which the nurse has ready at hand.

Once the placenta is completely expelled, the uterus will in normal cases contract still further, until the fundus is

three or four fingers' breadth below the umbilicus, and the bleeding is then comparatively slight. If, however, there is any tendency to relaxation, massage is used to stimulate contraction and a dose of ergot (1 dr. of the fluidextract, by mouth) is given. As a further measure an ice cap may be placed over the fundus. The use of ergot is routine with many obstetricians, while others give it only if the bleeding is too free. If the patient is to be left with only her family to look after her, as must often be the case in a hospital out-patient service, it is safer to give the medicine and even to leave an additional dose to be taken an hour or two later. The nurse should inquire beforehand as to the routine of the physician. It is a safe rule to remain with the patient at least an hour after the delivery of the placenta, to guard against possible hemorrhage. During this time the fundus should be palpated from time to time to assure its firm contraction, and the discharge from the uterus should be observed. The pulse-rate should also be noted, as a rapid pulse sometimes gives warning of concealed bleeding.

Care after Delivery.—As soon as the placenta has been expelled, if there are no sutures to be taken and the baby does not require special attention, the mother is made comfortable. Even though she may be feeling no more pain, she is often cramped from keeping one position for so long a time, sore from the straining efforts, and wet, cold and thoroughly uncomfortable from lying on a wet pad or, as is sometimes the case, in a pool of fluid.

All the soiled dressings, sheets and towels are now removed with the draw-sheet, and the patient's thighs, buttocks and vulva thoroughly cleansed and carefully dried. A clean bed-pad is placed beneath her and a sterile pad is laid over the vulva, held in place by a T-binder. If the physician's practice is to use an abdominal binder, this is applied and the

pad pinned to it. A fresh night-dress is put on, which has been warmed if the weather is cold. In any case the patient should be well covered and a hot-water bottle placed at her feet, as there is often a reaction after the delivery and the woman may even have a postpartum chill. A hot drink is often very comforting, unless she has been deeply anesthetized. The use of an opium suppository by rectum is part of the routine after-care with some physicians, as it quiets the patient and gives her a good chance of getting to sleep. Whether it is used or not, rest is what she needs, and the nurse should see to it that the members of the family do not disturb her after the first congratulations are over. Meanwhile there are three things to be watched during the first few hours after delivery—the pulse, the fundus and the amount of bleeding. If any of these presents signs of hemorrhage, the nurse must report at once to the doctor. Some obstetricians order a routine dose of ergot, to be given in an hour or two, especially if the woman has a tendency to more than a normal amount of bleeding. The puerperium chart is begun as soon as the patient is comfortably arranged, with the temperature, pulse and respiration and the amount of discharge as the first items.

Asphyxia of the Child. Resuscitation Measures.—Asphyxia of the child is to be looked for in any case in which during labor there is prolonged pressure on the child, pressure of even short duration on the cord, separation of the placenta, or long anesthesia. The condition shows itself before the baby is born, by marked irregularity or weakness of the heart beat and changes in its rate *between* the pains. It must be remembered that it is normal for the rate to change *during* the pains. The passage of meconium is also a sign of asphyxia in a head presentation, as it means that the sphincter of the anus is becoming relaxed. In a breech

FIG. 64.—Byrd-Dew method. Flexion.

FIG. 65.—Byrd-Dew method. Extension.

presentation meconium is often squeezed out by the pressure of the birth canal, as the breech descends, and its passage does not necessarily mean asphyxia.

There are two types or, we might better say, two degrees of asphyxia, since in the more serious variety the condition has simply progressed further. In the first stage, asphyxia livida, the child looks purple and congested and the muscles are stiff. It may not be breathing at all, but is perhaps giving an occasional gasp. In the second stage, asphyxia pallida, the baby is white and limp, it makes no effort to breathe, and the heart is beating only faintly. This is a grave condition.

Treatment.—The treatment of asphyxia depends on the stage which it has reached. In asphyxia livida it may be enough to hold the child up by the feet to let the secretions or mucus run out of its mouth, and then stimulate the respiration by rubbing the body or giving a few light slaps across the buttocks. If there is much mucus in the mouth, it may be wiped out with a bit of gauze wrapped around the little finger, but this must be done gently, as the mucous membrane of the mouth is easily injured. If the air-passages are seriously blocked, the tracheal catheter or aspirator is used to draw the fluid out. A splash of cold water or a little ether poured on the chest will sometimes start the respiration. A common method of treatment is to place the baby alternately in a hot and cold bath, but this is too much of a shock for a deeply asphyxiated child, and in such a case a better method is to keep it in the warm bath and rub its chest with a piece of ice or splash the cold water on it.

If these simple measures are not effective, some kind of artificial respiration must be used. The Sylvester method, so commonly used for adults, is not as satisfactory for a newborn infant. The Byrd-Dew method, or one of its modi-

fications, is as effective as any. In this the baby's head is supported by putting the thumb and forefinger of one hand around its neck, while the other three fingers are under its back; the other hand holds the child's knees. The knees and chest are then brought together by flexing the body, to give the motion of expiration, and full extension of the body expands the chest and acts as inspiration. This alternate flexion and extension are repeated at regular intervals, about twelve times a minute. Too much force should not be used, as the child may be injured. In order to avoid chilling the child's body the manipulation may be performed with the baby in the hot bath or wrapped in a warm blanket.

Prochownik's method is to hold the child inverted, with its head just touching the bed or table so that it is slightly extended, and then to compress the chest lightly at regular intervals. This also favors the escape of fluids from the air passages. The Schultze swinging method is comparatively little used, because of the danger of hurting the child during this vigorous maneuver.

A simple method is rhythmical traction on the tongue with a hemostat or suture, while the child lies with its head hanging over the edge of a table; this can also be done in the warm bath.

The pulmotor or lung motor is used by some physicians, but is not, as a rule, found outside of a hospital.

Oxygen may work wonders. It is given through a funnel held over the baby's face. Unfortunately it is seldom available in the home. In an emergency, the respiration has often been started by direct insufflation—breathing into the child's mouth to expand the lungs and compressing the chest to force out the air. Care must be taken not to inflate the stomach.

If the child is in a state of pallid asphyxia, the measures

of resuscitation must be of the gentlest, as the more vigorous methods may even turn the scale against it. The baby must be kept as warm as possible in the warm bath or in hot blankets, and the application of cold is absolutely contraindicated. The air passages should be cleared and artificial respiration, by the Byrd-Dew method or mouth-to-mouth insufflation, begun at once. Oxygen is particularly valuable in these cases. If the heart action is very weak, the doctor

FIG. 66.—Administration of oxygen.

may order a small dose of some heart stimulant, such as strychnine, ether, brandy or camphorated oil, to be given by hypodermic. The efforts at resuscitation must not be relaxed as long as there is even the faintest flicker of a heart beat, as the most desperate cases will sometimes respond after all hope has been abandoned.

After the respiration has been established, if the case has been one of pallid asphyxia, the baby must be carefully

watched for some hours, as the respiration may grow weaker and fail, if no additional care is given. The child must be kept especially warm, and the hot-water bottles in its crib renewed as fast as they become cool. Oxygen should be at hand, to be administered if the infant becomes at all cyanosed. The bath must be postponed until there is no danger to be feared from cooling the body surface, and the baby should be gently rubbed with warm oil instead.

If the child is premature, the measures of resuscitation to be employed are those suited to a case of asphyxia pallida, since the baby is often too weak to stand much handling.

CHAPTER VI.

COMPLICATIONS OF PREGNANCY.

Vomiting of Pregnancy.—Nausea and vomiting are so common in early pregnancy as to be considered among its diagnostic signs. The familiar name of "morning sickness" gives the clinical picture, since it is in the morning that the patient is thus troubled. If she remains in bed until after her first meal and takes but a light breakfast, she may be able to keep it down. One of the most important points in the treatment is rest after taking food. Laxatives and digestive mixtures may be helpful and cerium oxalate has long had a partially deserved reputation in the treatment. The patient should be encouraged by the assurance that the condition will not last long.

Indigestion.—As the uterus rises in the abdomen and crowds against the stomach and intestines, symptoms of indigestion are likely to result. The greater the distention of the uterus, as by twins or hydramnios, the more troublesome are the symptoms. The patient's most frequent complaint is "heart-burn." Sometimes a simple remedy like bicarbonate of soda or aromatic spirits of ammonia relieves the worst of the distress.

Toxemia.—Toxemia has already been mentioned as one of the dangers of pregnancy which can be largely controlled by prenatal care. It is due to a heaping up in the mother's system of waste products and perhaps actual toxins from the fetus, which are not carried off by her eliminative organs.

Both the kidneys and the liver may be so affected by toxemia that serious degenerative processes set in. The signs and symptoms of a beginning toxemia are, as before stated, eye symptoms, headache, dizziness, constipation, scanty urine (showing albumin and often casts as well), edema and high blood-pressure. If the condition is neglected, the patient may become more and more drowsy and lethargic and finally die in coma. More often toxemia develops into eclampsia, a condition marked by severe convulsions. A grave type of vomiting is a less common phase of toxemia.

Treatment.—The treatment of an early case of toxemia is largely hygienic. By restricting the diet and stimulating elimination the danger can often be warded off. The food must be light and easily digested, and plenty of fluid must be taken; it may be necessary to prescribe a milk diet. The bowels are kept moving freely and the output of urine is increased by diuretic drugs as well as by the fluids. Sweating by hot baths or packs helps the action of the skin.

Hyperemesis Gravidarum. Pernicious Vomiting.—Hyperemesis is an exaggeration of the nausea and vomiting which are so common in pregnancy. It may be caused by some local trouble, such as a uterine displacement, or more often, is a manifestation of toxemia. A large number of cases must be set down to some nervous condition. The toxemic cases are the most serious.

As the condition progresses, the nausea and vomiting, instead of passing off in the course of the morning, persist throughout the day. Soon there is vomiting when any sort of food or even liquid is taken, and finally the retching comes on at the slightest movement, or when the patient is lying perfectly still. She becomes emaciated and exhausted from the straining and vomiting and the loss of sleep; her mouth is dry and cracked, and thirst becomes agonizing;

jaundice may appear; the temperature and pulse-rate increase; blood or "coffee-ground" material are brought up in the vomitus. If not controlled, the condition results fatally.

Treatment.—The time for treatment is early, before the vomiting has become pernicious. Diet is restricted to liquids, and very small amounts are given, perhaps only a teaspoonful at a time, until the stomach can tolerate more. Milk, albumen water, or Vichy, taken with ice, or just the opposite, hot water, milk or bouillon, should be tried. Sometimes the most unlikely sort of food, such as meat, bacon or salty things, meet with unexpected success. The patient herself may suggest something for which she has a special craving. In cases with a marked nervous element the nurse can do a great deal by making an attractive-looking tray. If no nourishment is retained, the physician will stop the attempt to give food by mouth and will resort to rectal feeding or the use of saline or glucose solution by rectum or saline by hypodermoclysis, to relieve the distressing thirst. Absolute quiet is essential in a serious case, and the patient may have to be kept in a darkened room.

The list of drugs which have been suggested includes a large part of the pharmacopœia, and although some may help, none can be counted on. Extract of corpus luteum is one of the newest remedies. Blood serum from a healthy pregnant woman has been used experimentally. Lavage of the stomach is worth trying. Gynecological procedures are occasionally successful. Finally there are cases in which, without any explainable reason, the trouble suddenly stops and never recurs. These are probably neurotic in origin.

If the condition goes on from bad to worse in spite of all treatment, the physician will reluctantly decide to interrupt the pregnancy by performing what is called a therapeutic

abortion. This is undertaken only when all other measures fail, and usually only after consultation with another obstetrician, since the responsibility of destroying the life of the fetus is a grave one.

Eclampsia.—By eclampsia we understand the occurrence of convulsions due to toxemia. These may come on during pregnancy, labor or the puerperium. In most cases the attack has been preceded by symptoms pointing to toxemia, but occasionally the convulsions begin so suddenly and unexpectedly that they fully justify the name eclampsia, which means a shining or flashing forth.

The convulsive movements begin with a slight twitching of the face which spreads to other muscles until the whole body is thrown into violent spasms. The jaw becomes set and the tongue and lips may be badly bitten; blood-stained froth appears at the lips; the face becomes purple as the breathing is stopped by the spasm of the respiratory muscles. An eclamptic convulsion is so distressing to witness that it seems to be lasting a long time, but in reality the average duration is only about a minute. The spasm at last relaxes, and for a little while the woman lies unconscious, breathing heavily. After the first convulsion she soon regains consciousness and is apparently unmindful of what has happened, but if the convulsions recur, the periods of unconsciousness grow longer until she is in a state of coma from which she cannot be roused. Her face becomes so swollen and discolored that she may be actually unrecognizable. The pulse runs up and the blood-pressure is high, often around 200. The temperature may also rise. If the disease cannot be controlled by treatment, the patient finally dies in a convulsion or in deep coma. In some cases death is due to edema of the lungs. Even if the treatment is successful, the convulsions may be followed by a period of mental confusion,

during which the patient screams and struggles and becomes quite unmanageable. This condition gradually clears up, but the woman is usually left without any memory of what has passed, and may not even remember the birth of the child.

Treatment.—Since eclampsia is simply a late manifestation of toxemia, the preventive treatment is that already covered under the heading of toxemia. It is summed up in the one word *elimination*. If the body can get rid of the poisons circulating through it before they have done too much damage, the toxemia will be controlled and there will be no eclampsia.

Even after the convulsions have come on, elimination will still play a large part in the treatment. The lower bowel is emptied by a thorough flushing and vigorous purgation is started. Croton oil is a favorite prescription. It must be remembered that this is so powerful a drug that its dose is only 1 to 3 drops, and also that on account of its irritant, almost corrosive action, it must be well diluted and mixed with a full dram of olive oil. If this is introduced far back on the tongue, it will usually be swallowed, even though the patient seems to be unconscious. Castor oil and Epsom salts are also used. Lavage of the stomach is recommended. If this is done, the salts, dissolved in a glass of water, can be introduced directly into the stomach through the tube.

The bladder is emptied by catheterization, the amount of urine measured and the specimen saved for examination. If the patient is sufficiently conscious to swallow easily, diuretic drugs are given. For more rapid action and for unconscious patients warm salt solution by rectum is more efficacious. The action of the kidneys may be further stimulated by the use of hot poultices over the loins or by cupping. Hot packs aid the elimination through the skin, but on account of their

depressing effect they should not be continued for more than twenty or at most thirty minutes, and the patient must be closely watched and her pulse noted at short intervals.

Every care must be taken to keep the patient from injuring herself during the convulsions, and some contrivance to prevent her biting her tongue and lips is absolutely necessary. A well-padded tongue depressor, mouth gag or clothes pin, or even a folded towel, will serve this purpose.

Chloroform and ether were formerly used as a routine to control the convulsions, but have been largely abandoned because of their effect on the already damaged kidneys and their depressing action on the heart. Oxygen is given to relieve the cyanosis.

Quiet is an essential part of the treatment. The necessary manipulations must be performed with the least possible disturbance to the patient, since a sudden noise or movement often brings on a fresh convulsion.

Venesection may be performed by the physician to lower the blood-pressure and remove at least a small part of the poison in the circulation. The vein at the bend of the elbow is chosen. It may be punctured with a hollow needle or scalpel, or if small, must be dissected out first. As much as 1 pint (500 cc) of blood can be removed with benefit to the patient, but the amount is gauged by observing her pulse, blood-pressure and general condition during the process. The blood is often thick and dark and clots so quickly that the results are not satisfactory. To dilute the toxins in the system saline solution is introduced by hypodermoclysis or even intravenously, as well as by the rectum.

There is great difference of opinion as to the wisdom of using sedative drugs, such as morphine, chloral, etc. Veratrum viride was once popular.

Unless the patient responds promptly to treatment, the

physician will go on to perform immediate delivery, by whatever operative means may be best suited to the particular case. Even Cæsarean section is used.

It will thus be seen that the duty of the nurse, as soon as she has notified the obstetrician of the onset of the convulsions, is to prepare for any of the above measures which he may order and have everything in readiness for an operative delivery. If unable to reach a doctor, she can at least protect the patient from injury during the convulsions, give an enema and apply external heat. In keeping the patient's chart she should carefully record the time and duration of the convulsions, the pulse and temperature, and the quantity of urine passed, saving the specimen for the doctor to see.

CONDITIONS IN THE UTERUS.

Displacements.—Posterior displacements of the uterus give troublesome pressure symptoms during the first three months while the uterus is still a pelvic organ. In most cases a retroverted uterus will right itself as it rises out of the pelvis, but especially if it is bound down by adhesions, it may be held in the pelvis, crowded down under the promontory of the sacrum (*incarcerated* is the technical term) until abortion takes place. If recognized in time by the physician, the condition can usually be corrected so that the pregnancy goes on to term. In neglected cases serious symptoms may arise. Once more the moral is to avoid trouble by consulting the doctor early.

After the uterus has risen up into the abdomen, it may be displaced anteriorly, if the abdominal walls are too weak to hold it up in good position. This state of things is often

seen in women who have had a long succession of pregnancies at short intervals. The uterus may sag forward

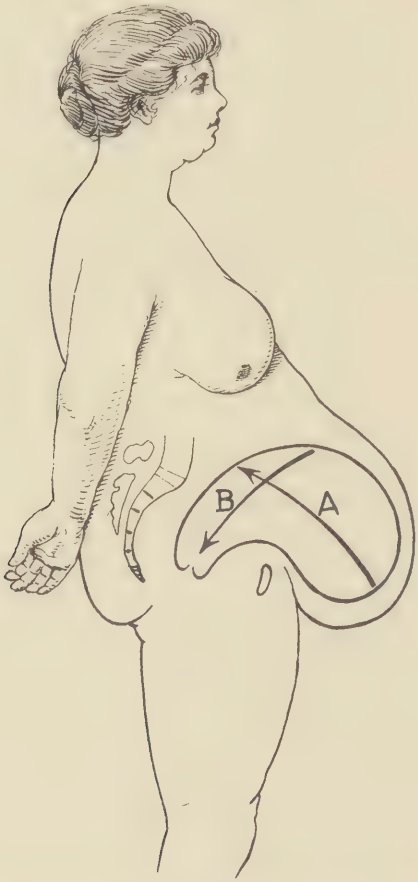

FIG. 67.—Pendulous abdomen with misdirected force causing inertia. (Cragin.)

for want of support, until the fundus is even lower than the cervix. Such a condition is a cause of malpresentations and

makes labor difficult. It is greatly relieved by wearing an abdominal binder or belt of some sort.

Hydramnios and Oligohydramnios.—An excessive accumulation of amniotic fluid is called hydramnios. In extreme cases the quantity may run up to two or three gallons. The overdistention of the uterus adds to the discomfort of the woman during pregnancy, partly on account of the added weight but more because of the pressure symptoms, particularly a distressing shortness of breath which results from the pressure against the diaphragm. Hydramnios predisposes to malpresentations and prevents early engagement of the head by letting the fetus float about so easily that it does not remain long in one position. It is a frequent complication of twin pregnancy. When the membranes are ruptured the nurse should have a basin of some sort to catch the fluid, otherwise the bed will be drenched.

Oligohydramnios is just the opposite condition. The amniotic fluid may be so scanty that the fetus is deformed by the pressure of the uterine wall.

Hydatidiform Mole.—This is a degeneration which attacks the chorionic villi, changing them into little sacs full of fluid, until the whole placental mass has the appearance of a bunch of small grapes. The fetus soon dies from lack of nourishment. The mole may burrow down into the uterine wall, causing hemorrhage; if left too long in the uterus, it has a tendency to cause a malignant growth. Miscarriage is the usual end of the process. If the diagnosis is made before this happens, the physician will empty the uterus at once.

Chorio-epithelioma.—Chorio-epithelioma is the malignant growth which results from a hydatidiform mole. It may also follow cases of abortion and normal full-term labor. Fortunately it is a rare complication, for it is the most

rapidly-growing and fatal of all forms of cancer. Uterine hemorrhage is its chief symptom. The treatment is immediate hysterectomy.

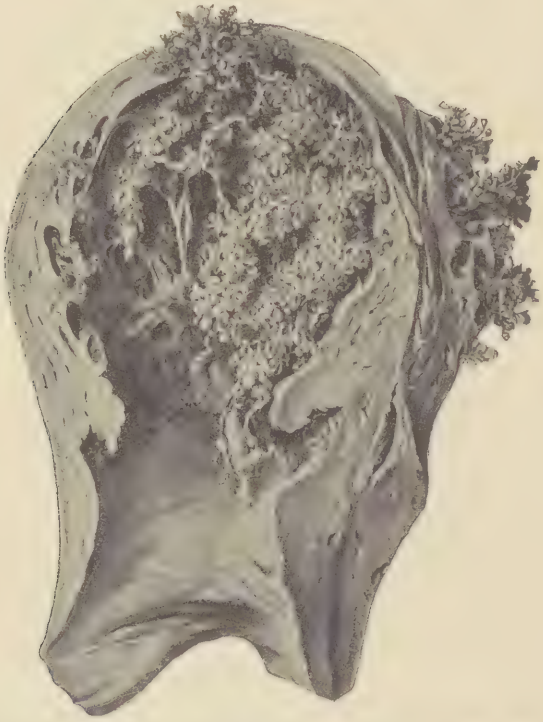

Fig. 68.—Hydatidiform mole perforating the uterine wall. (Bumm.)

Hemorrhage. — Hemorrhage during pregnancy is practically always from the uterus and means but one thing, the separation of the placenta (or before the formation of the placenta, the separation of the chorion) from its place of attachment to the uterine wall. Bleeding in the early months is usually a sign of a beginning abortion. In the

last few months the separation is often caused by a malposition of the placenta, which is implanted so low in the uterus that it encroaches upon the internal os—the condition known as placenta previa. Detachment of a normally implanted placenta in the late months is really the same process as that which occurs in an abortion, but it is attended with far graver danger, because the uterine vessels are so much larger at this time that the hemorrhage may be rapidly fatal, before the fetus can be extracted. Fortunately it is rare.

In any case of hemorrhage, at whatever time in pregnancy and from whatever cause, the doctor must be notified at once. The patient must be put to bed and kept absolutely quiet, with her head low. If there is much bleeding, the nurse will busy herself, while waiting for the physician, in making all possible preparations for the physician's examinations, the treatment of hemorrhage and even an operation. If the hemorrhage becomes dangerously profuse before his arrival, she may have to take the responsibility of packing the vagina tightly with sterile gauze or cotton, to make pressure on the cervix, and giving the patient such stimulation as may be needed. The foot of the bed may be raised, if the patient shows signs of faintness.

Abortion. Miscarriage.—Abortion is technically the interruption of pregnancy at any time before the fetus is viable, in other words, before the twenty-eighth week. It is common usage to call it a miscarriage after the fourth month, and in speaking to the "laity" that term is used for all cases which have come about spontaneously.

An induced abortion is one which is brought on by artificial means. When induced by a physician on account of some condition which menaces the mother's life, it is called a *therapeutic abortion*, because it is a necessary therapeutic

measure to cure or relieve the condition. Since it must mean the destruction of the life of the unborn child, it is undertaken only when there is grave danger for the mother in the continuance of the pregnancy, and no reputable physician would countenance its performance under other circumstances. Unfortunately there are unscrupulous doctors and midwives who are little more than professional abortionists, and to them turn many women who wish to be relieved of the burden of pregnancy for merely personal reasons. More than this, it has become a commoner practice than most people dream for women to undertake certain procedures on themselves, without a thought of the moral or legal wrong of the act and the danger of it. Not only are abortions thus induced very properly considered criminal abortions and made punishable by law, but they are responsible for invalidism and the loss of many lives from hemorrhage and infection. The nurse cannot set her face too strongly against such practices, and since she often comes into more confidential relations with her patients than the doctor can, she has an opportunity to wield a powerful influence for good which she should never neglect.

Abortions are classified according to the stage which the process has reached. A threatened abortion is only beginning and there is good hope of preventing it from going any farther, while an inevitable abortion has progressed so far that treatment is of no avail to stop it. An abortion is incomplete when only a part of the contents has been expelled; it is complete if everything has come away and the uterus is empty.

The causes of abortion include: (1) Conditions in the uterus, such as endometritis, displacements, defective implantation of the placenta on the uterine wall; (2) disease in the mother, especially various fevers, influenza and

syphilis; (3) external causes, such as heavy work, blows and falls, rough rides, etc. Certain drugs might also be classed among the external causes. Experience has shown that the chemicals used in some industries affect the pregnant woman and predispose to abortion.

Treatment.—The preventive treatment of abortion has already been outlined under the hygiene of pregnancy. The treatment after the process has actually begun will depend on the stage which it has reached. A threatened abortion may be averted in many cases by absolute rest in bed and sedative drugs. An inevitable or incomplete abortion will require the emptying of the uterus, either with the hand or the curette. As already stated, packing may be necessary as a temporary measure to control hemorrhage; sometimes it stimulates the uterus to contract and expel its contents. If the abortion is complete, all that is needed is to keep the woman in bed, like a puerperal case, until the pelvic conditions are sufficiently normal.

Extra-uterine Pregnancy.—In this condition, which is also known as ectopic or tubal pregnancy, the ovum becomes implanted and begins to develop outside of the uterus in the Fallopian tube. It is easy to see that there will be scant room in the tube for the fetus to grow, and it is therefore not surprising that in the majority of cases the fetal mass either squeezes its way out through the fimbriated end of the tube (tubal abortion) or breaks through its wall (tubal rupture). In either event there is likely to be profuse hemorrhage and the woman may die unless prompt measures are taken. If the mass ruptures through the tube between the layers of the broad ligament, a hematoma may form and become so walled off that the hemorrhage is stopped. In some rare cases the fetus passes out into the abdominal cavity without dangerous hemorrhage and continues its growth there. This

condition is called abdominal pregnancy. If it is recognized in time, the child can be removed by an abdominal operation. More often it is overlooked and spurious labor with so-called false pains comes on at term, followed by the death of the child. The fetus may then be carried in the abdomen for years as a mummified fetus or a calcified mass called a lithopedion or stone child, but it may also decompose or become infected, setting up serious symptoms.

Fig. 69.—Tubal abortion. (Cragin.)

The diagnosis of extra-uterine pregnancy can usually be made if the physician sees the patient early enough and makes an internal examination, when the mass can be felt in the tube, at one side of the uterus. This is another argument for consulting the doctor at the beginning of pregnancy. Since rupture may take place at any time from the fourth week on, it is plain that many cases will escape notice until the alarming symptoms of rupture and hemorrhage appear. Occasionally the patient has had premonitory symptoms of

pain and irregular bleeding, with the discharge of bits of membrane. If the diagnosis is made, the treatment will be immediate operation to remove the tube and its contents before it has had a chance to rupture.

The diagnosis of a ruptured tubal pregnancy is usually not difficult. In a typical case, after a fall or even the merest slip or jar, which often is enough to bring about the rupture, the patient is suddenly seized with severe pain and all the symptoms of internal hemorrhage, shock and collapse. The obstetrician must be notified at once and a laparotomy performed without delay if the woman's life is to be saved. If the rupture is between the layers of the broad ligament, the mass may be emptied out through the vagina, without the necessity of an abdominal operation. The nurse will make the usual preparations for operation and also have in readiness everything which may be needed for the treatment of hemorrhage and shock.

Cardiac Conditions.—Pregnancy throws additional work on the heart, and labor adds the strain of fatigue and pain, variations in blood-pressure and most of all, the muscular efforts of the second stage. The normal heart is strong enough to overcome these difficulties, but one with weakened muscle or valve lesions may give way under the strain. A patient with cardiac trouble should be warned of the possible effect of over-exertion during pregnancy. She must follow with the greatest care any directions which the physician lays down with regard to rest, diet and elimination, since a comparatively slight attack of indigestion or constipation may have serious consequences. The nurse should report such signs as weak, irregular or rapid pulse, dyspnea, dizziness or faintness. She will do well to ask for explicit directions as to the treatment to be used in a heart attack. An emergency may call for immediate stimulation of the

heart by such drugs as strychnine, caffeine, digitalis or camphorated oil, given hypodermically.

The obstetrician will make labor as easy as possible for the patient. Perhaps he will shorten the second stage by applying forceps, since even the combination of the operative procedure and the anesthetic involves less strain on the heart than the muscular exertion of the bearing-down pains. Perhaps he will induce labor a little before term. A grave heart condition, not yielding to other treatment, may even require the induction of abortion to save the mother's life.

Varicose Veins.—As pregnancy progresses, the pressure of the growing uterus interferes with the return flow of the blood from the lower limbs and varicose veins may result. These more often develop in the legs, but are not uncommonly seen on the vulva as well. If the varicosities are large, there is danger of their rupturing.

An abdominal binder may relieve the pressure by giving support to the uterus, but a well-fitting elastic stocking is almost a necessity in some cases. A less expensive appliance is supplied by strips of adhesive plaster, placed below the most prominent veins.

Diseases of the Urinary Tract.—Examination of the urine during pregnancy occasionally shows the presence of sugar. This is often connected with some upset in the general metabolism. True diabetes is rare. Albumin and casts suggest toxemia but are also present in chronic nephritis which has been aggravated by pregnancy. Pus in the urine means cystitis or pyelitis. The latter condition is characterized by attacks of severe pain, with fever or chills. It usually yields to simple treatment with diet, diuretics and some urinary disinfectant like hexamethylenamin, and local application of heat to relieve the pain. Cystitis and pyelitis are also complications of the puerperium. The cause

has sometimes been traced to careless technic in catheterization.

Acute Infectious Diseases.—The acute infections as complications of pregnancy carry with them a double danger, since they may affect both mother and child. The effect on the fetus may be due to the high temperature or to the poison of the disease itself, which may be transmitted in the form of the organisms or more often as their toxins. In either case the fetus may die and miscarriage will then follow.

These infections run a more serious course in the pregnant woman, who must moreover face the chance of miscarriage or premature labor to make things worse. Especially dreaded are the streptococcus infections, including erysipelas and scarlet fever, and now influenza has been added to the list as the most deadly of all. In the severe pandemic of 1918 one pregnant woman after another sickened, miscarried and died, in spite of her physician's best efforts.

The only special directions to a nurse in charge of such a case are therefore to be on the watch for symptoms of beginning abortion and to report at once to the doctor if any arise.

Tuberculosis.—There was an old idea that pregnancy had a beneficial effect on tuberculosis, but in point of fact the tuberculous process is often hastened by pregnancy, although with proper care an incipient pulmonary case can sometimes be carried safely through. During labor the straining muscular efforts with the increased blood-pressure may bring on an attack of dyspnea followed by collapse. Even after the delivery the danger is not over, for the disease may suddenly flare into activity during the puerperium and progress rapidly to its end like the old-fashioned "galloping consumption."

The treatment of tuberculosis is attended by certain diffi-

culties during pregnancy. The high protein diet and abundant nourishment, with even forced feeding, are not well suited to the pregnant woman, whose metabolism is easily disturbed and for whom proteins must be limited on account of the effect on the kidneys. Rest is hard to secure for her heart while pregnancy is continually throwing extra work on it. Moreover the pressure of the growing uterus against the diaphragm may seriously embarrass the respiration. The patient must be kept under the closest surveillance, and rise of temperature or pulse-rate, cough and loss of weight carefully noted. If she is found to be losing ground, it will be necessary to interrupt the pregnancy. In laryngeal tuberculosis treatment is so unavailing and the prognosis so bad that the obstetrician may induce abortion without more ado. A patient who goes on to term must be guarded as far as possible against the straining of the second stage of labor. The irritating effects of anesthetics on the lungs must always be borne in mind. It has already been mentioned in a previous chapter that tuberculosis is rarely transmitted to the fetus. The babies of tuberculous women are often strong and well-developed, with no sign of the disease. The mother must not be allowed to nurse her child because of the drain on her strength and the danger of infecting the baby through the close contact.

Venereal Disease.—Gonorrhea and syphilis are dreaded as obstetrical complications, and rightly so. Their disastrous effects do not stop short with the mother but extend to the child as well.

Gonorrhea.—Pregnancy has no marked effect on the course of the disease, except that on account of the increased blood supply to the parts, the so-called venereal warts are more likely to develop. Sometimes the discharge grows more profuse.

The effects of gonorrhea on the mother are:

1. Inflammation of the uterine mucous membrane (endometritis) leading to abortion.

2. Puerperal infection.

3. Later pelvic inflammatory trouble, especially in the tubes, often going on to abscess formation (pus tubes) and necessitating serious operations.

4. Sterility, following the inflammation in the tubes.

The results to be feared for the child are:

1. Death of the fetus, in the cases of abortion.

2. Ophthalmia neonatorum, a dangerous infection of the eyes, which is a frequent cause of blindness.

3. Vulvo-vaginitis, in girl babies, especially if born by the breech.

The disease should be treated as thoroughly as possible during pregnancy, to prevent its extension by puerperal infection and to guard the child from infection of its eyes at the time of birth. Douches given during labor may cleanse the vagina and so lessen the chance of such infection, but on account of the danger the routine prophylactic treatment of the eyes by the Credé method should be given as soon as the baby is born. The nurse cannot be too careful in the precautions which she takes to prevent the spread of the disease. All pads and dressings from the mother must be burned at once. The nurse must wear gloves when caring for the patient and must moreover disinfect her hands most thoroughly afterward. On no account should she touch her face or eyes if there is the slightest chance that her hands have been in contact with infectious material. If the solution should spatter in her face while she is giving a douche, she must at once wash her face carefully and use the proper prophylactic treatment for her eyes.

The symptoms and treatment of gonorrheal puerperal

infection and ophthalmia will be taken up elsewhere (pages 199 and 240).

Syphilis.—Syphilis is like gonorrhea in running its usual course during pregnancy, but unlike it in seldom complicating the puerperium, although syphilitic fever at that time is not unknown. It is still more unlike it in not causing sterility, since the records show that syphilitic women often give a history of many pregnancies. It is, however, far more disastrous than gonorrhea in its effect on the child.

Syphilis acts on pregnancy chiefly by interrupting it before term. Premature labor is common and late abortions rather than early ones are the rule. If a woman has a record of recurrent premature labors, syphilis is always to be considered as a possible cause.

Still more characteristic is death of the fetus in the uterus and its retention there until the body is badly macerated by the time labor sets in. While there are other causes of intrauterine death, such as nephritis, hospital statistics hold syphilis responsible in from two-thirds to four-fifths of the cases. A macerated fetus is a most unsightly object, limp and discolored, with the skin peeling off over large areas of its body. Its head is collapsed and the bones give the impression of floating about in fluid; this makes the birth of the child often unexpectedly quick. Sometimes the amniotic fluid is a dirty reddish brown or green in color. The diagnosis of syphilis may be inferred if the mother has a positive Wassermann test. In a doubtful case a postmortem examination will show other syphilitic changes in the organs and the presence of the spirochetes, usually in the much-enlarged liver.

Even when the infection is not severe enough to kill the fetus, it is likely to show itself sooner or later. Sometimes the child is born with the disease in a more or less advanced

stage; sometimes the symptoms do not come on for a few weeks after its birth; and finally there are the cases of so-called late hereditary syphilis, in which the manifestations of the disease are delayed until the sixth year or even until puberty.

On account of this danger of transmission of syphilis to the child in the uterus, it is of the greatest importance to detect the presence of the disease in the mother. Since she may infect the fetus even when she has no discoverable lesions herself and gives no history which suggests any previous trouble, recourse must be had to the Wassermann test, which should be a routine procedure in every clinic. If this is positive, treatment must be started at once, with the hope of saving the child as well as curing the mother. If it is not practicable to give the Wassermann test in every case, it should at least be done whenever a woman gives a history of miscarriages, premature labors or dead fetuses. The symptoms of syphilis in the child will be discussed under diseases of the newborn.

It is probably unnecessary to warn the nurse of the extremely infectious nature of syphilis, but the need of care cannot be emphasized too often. Any abrasion of the skin may be a portal of entry for the infection.

CHAPTER VII.

COMPLICATIONS OF LABOR.

DYSTOCIA.

Dystocia means difficult labor. It is the result of some abnormality in the forces of labor, the passages through which the child must pass, or the passenger, as the fetus itself is often called. Various accidents of labor will also add to the difficulty.

Abnormality of the Forces. Maternal Dystocia.—The commonest abnormality of the forces is uterine inertia, in which the contractions become weak and irregular or even cease altogether. In the old days, when ergot was used to strengthen the pains, inertia was often replaced by quite the opposite condition, a continuous tetanic contraction of the uterus resulting from the stimulation of the drug. If the delivery could not be effected soon, the outcome was all too often a dead baby, on account of the continued pressure, or even rupture of the uterus.

Inertia is to be looked for in women whose uterine muscle is weakened by a rapid succession of pregnancies or stretched by twin pregnancy or hydramnios. In most cases it results from the fatigue of a long labor.

The nurse can do a great deal to prevent inertia by conserving her patient's strength and keeping up her courage. If it occurs, the physician's treatment will vary according to the conditions present. Some patients need only rest to enable them to go on with fresh vigor, and will respond

wonderfully to an opiate. Others require stimulation of the muscle, which may be secured by the long-tried quinine and strychnine or the newer preparation, pituitary extract.

Abnormality of the Passages. Maternal Dystocia.—Abnormality of the passages may be in either the bony pelvis or the soft parts of the birth canal. If the pelvis is small (or *contracted*, to use the technical term), labor may be only prolonged while the extra resistance is being overcome, but it is sometimes so obstructed that the child cannot be born by the natural passages and Cæsarean section is necessary. The commonest types of contracted pelvis are the flat pelvis, in which only the antero-posterior diameter of the pelvic inlet is shortened, and the generally contracted pelvis, in which all the pelvic measurements are below normal. Rachitis (rickets) is often a cause of such deformities. Another common type is the funnel pelvis, in which only the pelvic outlet is decreased in size.

Obstruction by the soft parts, as for instance a rigid cervix, may be remedied by stretching or even by cutting the tissues. The physician will often dilate the cervix manually, asking the nurse to give the patient a few whiffs of ether or chloroform during the process.

Abnormality of the Passenger. Fetal Dystocia.—Dystocia due to the fetus may be on account of its size, particularly if the mother has gone beyond full term, so that not only is the child's head large but the bones are so hard that it cannot be easily moulded. Malpresentations of the fetus are a frequent cause of dystocia and deserve to be taken up in some detail.

Malpresentations.—*Posterior Positions of the Occiput.*—Normal labor has been described for the anterior positions of the occiput, L. O. A. and R. O. A. The occiput may also be turned posteriorly in the positions R. O. P. and L. O. P.

The former is far more common. Labor is longer in the posterior positions because at the time of internal rota-

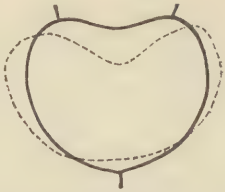

FIG. 70.—Diagram showing outline of brim of normal and of flat rachitic pelvis. Black line, normal; dotted line, flat. (Jewett.)

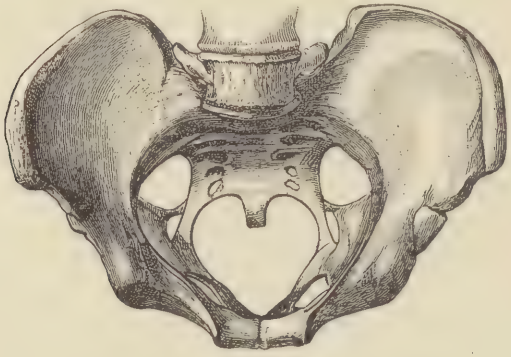

FIG. 71.—Funnel-shaped pelvis. (Jewett.)

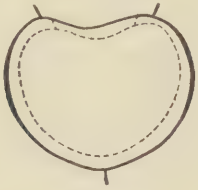

FIG. 72.—Diagram showing outline of brim of normal and of justominor pelvis. Black line, normal; dotted line, justominor pelvis. (Jewett.)

tion the head must turn through a longer distance to bring the occiput under the symphysis; but unless the patient

becomes fatigued, the birth is usually spontaneous if this anterior rotation takes place. In a small proportion of the cases, however, the head, instead of rotating anteriorly, turns posteriorly so that the occiput lies in the hollow of the sacrum. Even then we may hope for spontaneous labor, but the process is still further prolonged because in this position the head does not fit so well in the birth canal. Not infrequently it becomes wedged in an unfavorable position, especially if it is large, and labor comes to a standstill. In such cases forceps must be used.

FIG. 73.—Moulding of head in face presentation.

Face and Brow Presentations.—If the head is not well flexed when it enters the superior strait, the brow will present or, if the extension is still greater, the face will be the presenting part. These cases are rare, especially the former. In face presentations, if the chin is directed anteriorly, the labor will probably be spontaneous but long; if posteriorly, the chin may rotate into the hollow of the sacrum, in which case it is not able to stretch down to the vulvar opening and

an operative delivery is necessary. In face presentations the caput forms over the face and the child when born is a distressing sight, with its features distorted by the swelling and edema. The parents must be warned what to expect, but they may also be assured that the condition will clear up.

Breech Presentations.—Breech presentations occur in about 3 per cent of all cases; they are more frequent in premature births than at term, and quite common in twin pregnancy. If the breech alone presents, the case is one of frank breech; if one or both of the feet slip down in advance of the breech, it is a footling.

Labor is likely to be longer than in vertex presentations, because the breech does not dilate the parts as effectively as the firm, round head. Although spontaneous delivery results in many cases, the obstetrician must be ready to interfere at a moment's notice if there is any delay, as there is more chance of pressure on the child and particularly on the cord during the birth. Sometimes the cord prolapses and is caught between the child's body and the pelvis. The nurse must watch the fetal heart even more carefully than usual and report at once if it shows signs of failing.

The mechanism of labor is naturally just the reverse of that in the ordinary vertex presentation. The breech enters the pelvis lying obliquely, but as it descends it rotates until it is lying antero-posteriorly, with one hip under the symphysis and the other against the sacrum. The posterior hip is born first, followed by the anterior. The body is then forced down until the shoulders appear, and while the anterior one is wedged under the symphysis, the posterior slips out over the perineum. After the anterior shoulder is born, the head turns so that the occiput is anterior and then emerges from under the symphysis.

It must be borne in mind that as soon as the umbilicus has passed out from the vagina, there is usually pressure on the cord. Since this means shutting off the child's oxygen supply and since, as we have already learned, the fetus cannot live more than eight minutes without oxygen, it naturally follows that not more than eight minutes at the most can be allowed to elapse between the appearance of the umbilicus and the birth of the head. If the shoulders or head should be caught, the physician must at once complete the delivery.

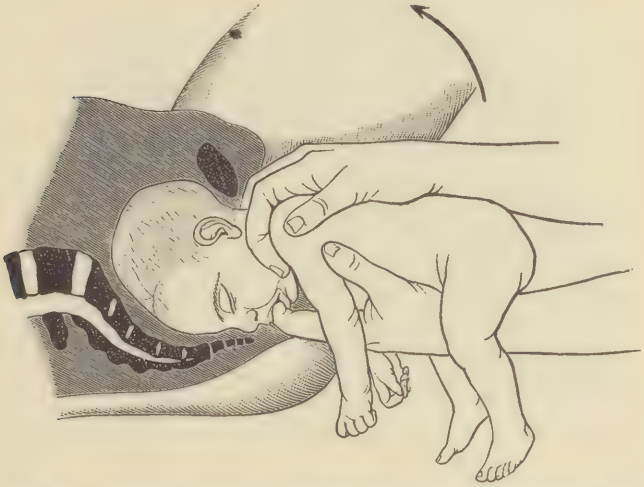

FIG. 74.—The Mauriceau or Smellie-Veit method of extracting the after-coming head.

In any case of breech presentation the patient should be brought to the edge of the bed for the delivery, since the doctor can work to much better advantage. In case of delay he will reach in to bring out the arms and then extract the head, by what is called the Mauriceau or Smellie-Veit method, steadying and flexing it by putting one finger

in the child's mouth, while he makes traction on the shoulders or pressure on the fundus with the other hand. The nurse can help by making the pressure over the fundus, obliquely downward, as in the Dublin method of expressing the placenta. If the head is too firmly wedged to be extracted in this way, forceps may have to be applied. They should be at hand, ready sterilized, in every case, so that no precious time will be lost in an emergency. All preparations should be made for resuscitating the baby. As the perineum is often lacerated during the rapid extraction of the head, the instruments for repair are likely to be needed.

In the absence of the doctor the nurse must be ready to act to save the life of the child, and if pressure on the uterus does not serve to bring about the delivery within the time limit, she must try to extract the head as above described. Prompt action should be her watchword, after the body is born.

Transverse Presentation.—A transverse presentation, also known as a shoulder presentation, is always a serious complication, since the child cannot be born if it remains lying across the pelvis. If there is no one at hand to give the proper treatment, the child will die from the pressure and the uterus will probably rupture in the effort to expel it, with a fatal result for the mother as well. Even the "laity" know the dangers of a "cross birth."

If the presentation is recognized during pregnancy, it is often possible to change it by external manipulation. If the woman goes into labor with the fetus lying transversely, the obstetrician must perform version, reaching up into the uterus with one hand until the child's feet can be grasped, turning the child and then extracting it as in a breech presentation. The patient must, of course, be anesthetized for the operation.

MULTIPLE PREGNANCY.

In about 1 out of every 100 cases conception results in the development of more than one child. This is brought about by the fertilization of more than one ovum or an ovum with more than one nucleus or by other more complicated conditions which need not be discussed here. Heredity seems to play its part as a factor, for multiple pregnancy

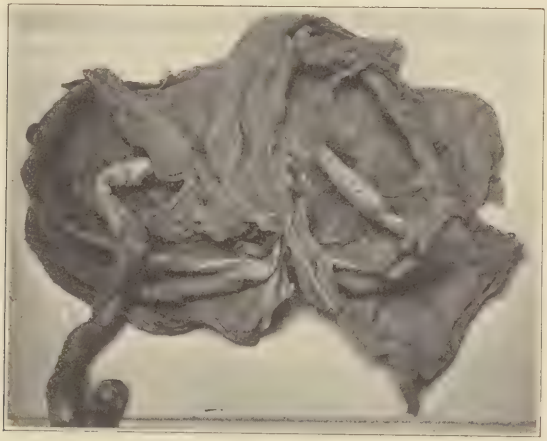

FIG. 75.—Placenta in double ovum twins. Two cords, two sets of membranes, placentas fused.

often runs in a family. The children are called twins, triplets or quadruplets, according as there are two, three or four of them, but it is so rare for more than two to be born (triplets occur only once in 7000 or 8000 cases) that for practical purposes multiple pregnancy is represented by twin pregnancy.

If two ova have been fertilized, the twins are called double-ovum twins and each fetus has its own separate placenta and set of membranes, although the placentas may be so nearly

united as to have the appearance of a single large one. Single ovum twins, resulting from the fertilization of one ovum, have but one placenta between them, and their respective circulations may so overlap that one fetus is able to get more than its fair share of nourishment from the placental blood and thus develops at the expense of the other. Single ovum twins are always of the same sex, while double ovum twins may be of different sexes.

The diagnosis of twin pregnancy is suggested by the large size of the abdomen, but must be confirmed by mapping out more parts than could belong to one fetus or hearing two fetal hearts of different rates. This last is by far the surest sign. The two fetuses may take various positions, but most commonly they lie longitudinally, both presenting by the head, or one vertex and the other breech; more rarely both are breech presentations. The diagnosis is not very easy and in a large proportion of the cases it is not made until after the birth of the first child.

Because the uterus is overdistended by its contents, labor is likely to come on somewhat prematurely, and the babies are often below the average size, even when born at full term. For this reason labor may be comparatively quick and easy, although more often the first stage is long, because the uterine muscle has been so stretched throughout pregnancy that it cannot contract well. Even when there are two separate placentas, that of the first child remains in the uterus until after the second twin is born, when both placentas come away in the third stage. Operative interference may be necessary on account of uterine inertia, especially after the birth of the first child. Other complications of multiple pregnancy are hydramnios, pressure symptoms, varicose veins and a greater liability to toxemia. The weak contractions of the uterine muscle may be a cause

of postpartum hemorrhage, and the loss of its tone predisposes to subinvolution in the puerperium.

If the diagnosis of multiple pregnancy has been made early, the nurse should be prepared to be called to the case before the calculated date for a full-term confinement. At the time of the delivery she should have everything ready for an operative delivery, in case of inertia or malpresentation, and should also make the necessary preparations for the treatment of hemorrhage. The babies will require the usual care for premature infants, if they are not fully developed, and extra feeding, if they are large and strong and are not getting enough from their mother.

PROLAPSE OF THE CORD.

In the course of labor it sometimes happens that the umbilical cord slips down in advance of the presenting part. This is particularly likely to occur when the membranes rupture at the height of a pain and the fluid comes away with great force, as in a case of excessive amount of amniotic fluid; and also in malpresentations, such as breech and transverse, in which the presenting part does not fill in the pelvis well and so leaves room for a loop of cord to descend. Prolapse of the cord means death to the child from the shutting off of its oxygen supply, as the cord is compressed more closely between the pelvis and the presenting part.

On account of this grave danger the nurse must notify the physician immediately and while waiting for his arrival she must do what she can to prevent pressure on the cord. This is best accomplished with the patient in the knee-chest position, since in this position the fetus falls forward and is raised out of the pelvis. Having placed the patient thus, the nurse will disinfect her hands and replace the cord, push-

ing it up into the uterus past the presenting part, if possible. If the loop has prolapsed far enough to come in contact with vulva or any unsterile material, it should be wiped off with an antiseptic solution before replacing it. It should always be noted whether the cord is still pulsating, and if so, the rate should be counted. Successful reposition of the cord is not always possible, and even if the loop is replaced, it may be pushed down again by the uterine contractions. The patient should be kept in the knee-chest position as long as she can endure the discomfort of it, so that the cord will receive the least possible pressure. The Trendelenburg position also acts to relieve the pressure, and in an emergency a chair can be placed on the bed and the patient's hips elevated by lifting them upon it. The Sims position with the pelvis elevated by pillows is more comfortable than either of these, if the woman must be kept in it for any length of time.

The nurse may have noticed and reported changes in the fetal heart-rate which were the result of the pressure on the cord, but unless she has been instructed by the physician to make an internal examination, she has no way of knowing that prolapse has occurred until the loop has slipped down far enough to be seen protruding from the vagina. Internally the diagnosis is made by feeling a soft, pulsating mass beside or below the presenting part. Externally there is, of course, no difficulty in recognizing a loop of cord.

In any event the nurse should make all preparations for an operative delivery, since it is probable that the physician on his arrival will hasten the birth of the child by the use of forceps, breech extraction or version and extraction, as the case may require.

Placenta Previa.—In this condition the placenta, instead of being implanted in the upper part of the uterus, is in the

lower uterine segment, in the region of the cervix. In marginal placenta previa it reaches just to the edge of the internal os; in central or complete placenta previa it entirely covers the os. The latter type is far more serious.

FIG. 76.—Central placenta previa. Placenta between the head and the partly dilated os. (Hunter.)

Usually there has been slight bleeding or some blood-streaked discharge to give warning of the trouble, but a profuse hemorrhage may be the first sign. The bleeding comes on suddenly, painlessly and without any apparent

cause; the woman may even wake in the night and find herself lying in a pool of blood.

In cases of placenta previa the obstetrician is confronted with a double problem; the control of the hemorrhage and

FIG. 77.—Complete or central placenta previa. (Bumm.)

the prompt delivery of the patient. If the implantation is marginal and the bleeding only moderate, rupturing the membranes may accomplish the double purpose, provided that labor has already begun. A rubber bag may be intro-

duced into the cervix, to make pressure on the bleeding area while dilating the cervix. Braxton-Hicks' method is to draw one of the child's legs through the os and let it make the pressure. Most cases will require an operative delivery,

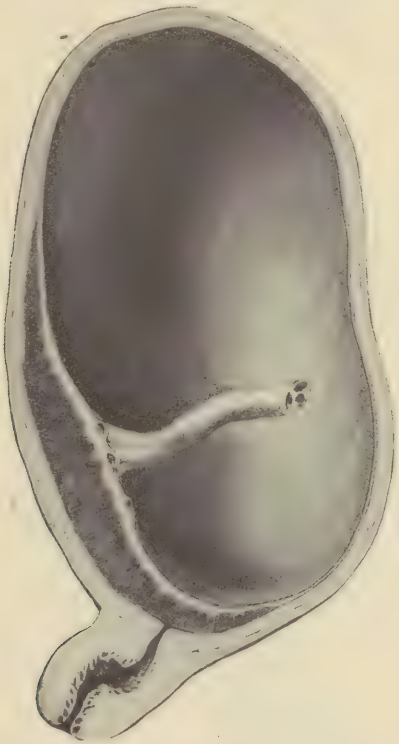

FIG. 78.—Partial placenta previa. (Bumm.)

whether by forceps, version or breech extraction. Cæsarean section may be the safest method, especially in central placenta previa.

The dangers of this condition are not over when the

delivery is finished, as postpartum hemorrhage is a frequent sequel. Sometimes the blood seems to have lost its power to clot. Placenta previa is one of the gravest obstetrical complications, and carries a high mortality for both mother and child, especially the latter.

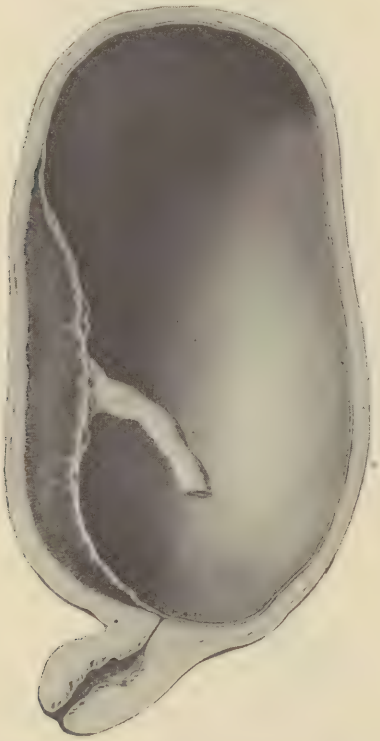

FIG. 79.—Marginal placenta previa. (Bumm.)

Premature Separation of the Normally Implanted Placenta.—This obstetrical accident, unlike the separation in placenta previa, is usually caused by a blow or injury and the hemor-

rhage is accompanied by severe pain. It is also known as accidental hemorrhage, an old name which dates back to 1780, and abruptio placentæ, a recent American term. The condition is even more dangerous to mother and child than placenta previa. It is practically impossible to control the hemorrhage, because the bleeding area is too high in the uterus to be reached by pressure, and immediate delivery is therefore the only hope. Cæsarean section has been used as well as other operative methods.

POSTPARTUM HEMORRHAGE.

Postpartum hemorrhage means hemorrhage after delivery. It may begin during the third stage of labor, when the placenta is only partially separated, but more often it appears after the placenta has been expelled. It is usually caused by the failure of the uterine muscle to contract and retract, sometimes because of clots or placental tissue in the uterus. Bleeding may also come from a deep tear in the cervix or rarely from the rupture of varicose veins in the vagina.

There is seldom any difficulty in diagnosing postpartum hemorrhage. In a typical case the blood almost pours from the vagina. There are times, however, when the hemorrhage is concealed, perhaps by a clot blocking the cervix, perhaps because the placenta, separating by the Schultze mechanism, holds the blood back in the uterus. In such cases the diagnosis may be made by the usual signs of internal hemorrhage—weakness, pallor, faintness, rapid pulse, sighing respiration, air hunger—but palpation of the uterus throws additional light on the matter. The fundus will be found higher than it should be—at or above the umbilicus, instead of three fingers below it—and its consistency is soft and flabby, since its muscle is not firmly

contracted. Its cavity is sometimes distended with blood. Pressure on the fundus forces out clots and a fresh stream of blood.

Postpartum hemorrhage is to be looked for in such cases as the following:

1. When the uterine muscle is either naturally weak or has been weakened during pregnancy by overdistention or strain on the walls.

2. When it has become fatigued during prolonged labor.

3. When its contracting power has been interfered with by drugs or anesthesia, or by manipulations.

It is therefore clear that preparations for the treatment of hemorrhage should be made in every operative case. Too vigorous and too early efforts at expressing the placenta before its separation are also a cause of hemorrhage.

The preparations for hemorrhage include:

1. An ice cap to be applied to the fundus.

2. Fluidextract of ergot; ampoules of ergot and pituitary extract for hypodermic use; a hypodermic syringe *which works*. If there is much likelihood of hemorrhage, the syringe should be filled beforehand so as to be ready for immediate use.

3. Hot sterile water or salt solution and a sterile outfit for giving an intra-uterine douche, including container, tubing and long glass nozzle. In an emergency a fountain syringe can be sterilized for this purpose, by boiling. The temperature of the fluid should be 112° to 116° F.

4. Gauze for uterine packing, four to six inches in width, with dressing forceps if the physician desires. More often the packing of the uterus is done by the manual method.

All these things should surely be ready, and if the case is a grave one, the patient will require the introduction of saline solution by rectum or under the breasts by hypo-

dermoclysis, or even into a vein by transfusion, to replace the fluid which has been lost. Heart stimulants will be needed in such a case. One of the most rapid in its action is camphorated oil, which can be obtained in ampoules, ready for hypodermic use. Strychnine, caffeine and the various forms of digitalis are standard heart stimulants; hot coffee, or ammonium carbonate in salt solution, can be given by rectum. The patient's head should be low, and if there is danger of anemia of the brain, the foot of the bed should be raised on two chairs or on blocks of wood. Hot-water bottles placed at her feet and warm coverings raise the body temperature. In a desperate case oxygen may be tried.

Pressure has been advised as a means of controlling the hemorrhage, usually by making direct pressure on the abdominal aorta through the abdominal wall for five minutes or more at a time. Momburg's method is to exert this pressure by a strong rubber tube tied tightly around the woman's waist. It is seldom used, but the nurse should know that such a method exists.

The simplest, quickest and most effective methods of treatment in the average case are massage of the uterus through the abdominal wall and the intramuscular administration of ergot or pituitary extract, and the nurse who finds herself alone in this emergency will place her main reliance on these two measures. After the fundus begins to harden under the hand, it should be pressed downward and forward against the symphysis and held there, with an ice-cap placed over it, if this is available. If the hemorrhage is not controlled by these means, a hot vaginal douche may be given by the nurse while some other person present is deputed to hold and massage the fundus. The administration of an intra-uterine douche and the packing of the uterine cavity are procedures which are not familiar to most nurses. It

is to be remembered that ergot is always given deep into the tissues, preferably on the outer side of the thigh, near the gluteal region. If injected superficially under the skin, it is apt to cause irritation and even inflammation.

After the bleeding has stopped, the patient will need careful watching for any symptoms of collapse or failing heart action, as well as for possible recurrence of the hemorrhage, which must be at once reported to the doctor.

RUPTURE OF THE UTERUS.

This is one of the most serious accidents of labor. The laceration is usually in the lower segment of the uterus, since the muscle here is not as thick and strong as in the fundus. It may occur when the muscle is weakened by disease or scar tissue (as after a Cæsarean section), but more often results from the efforts of the uterus to push the fetus past too great an obstruction. Among the conditions which cause obstructed labor are deformed or contracted pelvis; overgrowth of the child or a monstrosity like hydrocephalus; malpresentations, especially transverse presentations and the rare posterior positions of the chin; rigid soft parts and tumors in the uterus and birth canal; and prolonged dry labor. When ergot was used to stimulate uterine contractions during labor, it was responsible for many cases of rupture, and even pituitary extract, if given too early or in unsuitable cases, has had this untoward result.

Impending rupture of the uterus is to be feared when in spite of prolonged and vigorous contractions no progress is made. It is sometimes possible to see through the abdominal wall what is called the contraction ring, a line of demarcation between the upper and lower uterine segments, giving an appearance not unlike that of a distended bladder.

In a typical case of rupture the patient complains of sudden and unusually severe pain and the sense of something giving way at the height of a contraction. The contractions then subside and symptoms of shock and hemorrhage follow.

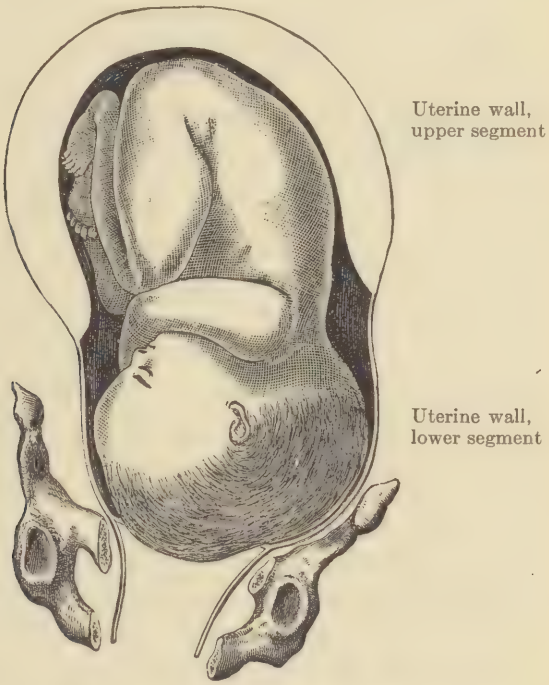

FIG. 80.—Thinning of lower segment of uterus in obstruction from hydrocephalus.

If such an accident occurs, the patient must be prepared at once for operative delivery and perhaps for abdominal operation. If the laceration is very extensive, hysterectomy may be necessary.

CHAPTER VIII.

THE PUERPERIUM.

Temperature, Pulse and Respiration.—In the typical normal case these should run a very level course, but variations are seen which are not necessarily pathological. During the process of involution there is bound to be a certain amount of absorption from the degenerating tissue in the uterus, and this shows itself by a slight rise of temperature. As long as this is not above 100° F. (38° C.), it is considered within the physiological limits. The pulse normally slows after the delivery and may drop as low as to 50 or even less without any bad effect. A rapid pulse-rate should always be regarded with suspicion.

A morning and evening record of temperature, pulse and respiration is usually sufficient, during the greater part of the puerperium, but it is often better, and in many hospitals is routine, to keep a four-hour chart for the first few days. The nurse will, of course, report any rise above the normal.

Lochia.—The amount and character of the lochia should be recorded on the nurse's chart. The amount can be gauged by the number of vulvar pads used in the twenty-four hours. It is always a wise plan for the nurse to ask the physician if he wishes a pad saved for his daily inspection. When the condition shows anything out of the normal, one should be kept for him as a matter of course. If the discharge remains red for more than the allotted time or if it is freer than normal, it is likely to mean delayed involu-

tion. The odor of the normal lochia is only that of fresh blood; any offensive odor should be noted and reported, as it is often a sign of too much decomposing material in the uterine cavity and the physician may wish to order special measures to control the condition. The nurse should remember that she will add greatly to her patient's comfort by changing the vulvar pads and cleansing the parts frequently, especially when the discharge has an unpleasant odor. The lochia should be slight in amount by the time the patient begins to get up and about; a temporary increase may be noted after she is up for the first time.

Care of the Vulva.—This part of the after-care requires special attention. The vulvar pads should be frequently changed. After urination or a bowel movement or when there is enough discharge to make the woman uncomfortable, the vulva is thoroughly cleansed and irrigated. An antiseptic solution, sterile water or salt solution may be used for the irrigation, according to the preference of the doctor. Careful drying of the parts afterward is important. If there are perineal stitches, the nurse will gently wipe off any discharge which may adhere to them, always taking care not to pull the sutures or irritate the wound. The after-care of a perineorrhaphy is described elsewhere. Swelling of the vulva is treated by hot or cold compresses. Boric acid and witch-hazel are among the favorite remedies.

After-pains.—Painful contractions of the uterus constitute one of the most trying complications of the puerperium, coming as they do, at a time when the patient is not expecting further discomfort. These after-pains are far more common in multiparæ, especially if there have been many pregnancies; they are particularly likely to occur when there are clots in the uterus which the contractions are trying to expel. Occasionally there are spasmodic contractions without any dis-

coverable cause. In any case the nurse can assure the patient that the pains will not last more than two or three days.

Treatment.—The treatment usually consists in measures to relieve the pain, such as hot applications or antispasmodic drugs. Opium in some form is occasionally necessary. Contrary to what might be expected, ergot sometimes acts successfully, by aiding the expulsion of material in the uterine cavity.

Bowels.—The constipation of pregnancy is likely to continue into the puerperium, since it takes some days for the intestines to regain their muscular tone after so many months of pressure from the uterus. As free elimination is an important aid in counteracting the absorption from the uterus, a daily bowel movement is a particularly necessary part of the regimen of the puerperium. The simpler laxatives are often unavailing and the more drastic cathartics are contraindicated on account of their depleting the milk supply. It is therefore customary for the doctor to give a standing order for an enema, if the bowels have not moved by the end of the day. The difficulty usually remedies itself after the patient is up and about.

Urine.—It is not uncommon for the patient to have some difficulty in voiding urine during the first two or three days after the delivery. This is often due to the fact that the urethra has become swollen and bruised in the course of the labor, a condition which will right itself without any special treatment. Another frequent cause of this trouble is the inability of the patient to use the bed pan while lying down.

If the bladder is not emptied, it becomes overdistended and rises into the abdominal cavity, pushing the uterus upward and to one side. The tumor formed by the bladder may be so prominent that it is mistaken for the uterus itself.

Every effort should be made to avoid the necessity of catheterizing the patient. The usual expedients—hot compresses over the bladder, irrigation of the vulva, pouring water from one vessel to another—should all be tried, and if the physician is willing, the woman may be allowed to sit up on the bed pan, as this measure is sometimes a happy solution of the problem. If all else fails, the catheter must be passed, with the strictest aseptic precautions. The nurse should always ask the obstetrician for explicit directions as to the length of time which may be allowed to elapse before the catheter is employed.

Tympanites.—The intestines, which have been pressed upon by the enlarged uterus during pregnancy, tend to balloon out after the delivery, when released from the pressure, and the abdomen becomes distended and tympanitic. This is a temporary mechanical condition, not to be mistaken for peritonitis. It is soon relieved by laxatives and enemata to carry off the gas and a firm binder to reinforce the abdominal muscles.

Lactation and Care of the Breasts.—The mother should be strongly urged to nurse her baby, not only for its sake but also because the act of nursing stimulates uterine contractions and thus promotes involution. There are few conditions which make nursing injurious to mother or child; chief among them are serious mental disturbance or actual disease, such as tuberculosis or grave anemia. It is generally supposed that in many cases a woman is unable to nurse her baby because her milk is too scanty or does not agree with the child. In point of fact these cases are few and far between. A mother will often think that her milk is of poor quality, because it is not white and thick like cows' milk, not realizing that the bluish color and thin consistency are characteristic of the human secretion. Nursing must never

be abandoned until chemical analysis has proved the milk unsuitable. It may be necessary to weigh the infant before and after feeding in order to convince the mother that it is really getting enough nourishment. The nurse's powers of persuasion, enlisted on the right side, will often turn the scale in favor of breast-feeding.

For the first two or three days after delivery the breasts contain only a scanty secretion of colostrum. On about the third day the true milk appears, often coming in so rapidly that the breasts become much engorged before the baby can empty them by nursing. There is occasionally a slight rise of temperature on account of the pain and discomfort, but this is by no means constant, and the old idea that the establishment of the secretion was uniformly attended by "milk fever" is another of the discarded notions of our forefathers. As a rule this condition of engorgement does not last for more than twenty-four hours and is entirely relieved as soon as the child is taking its full quota of nourishment.

It is hard to make an exact statement as to the composition of human milk, because it varies so much, even in the same woman. A sedentary life and heavy protein diet usually tend to make the milk rich in fat, perhaps even too much so; but sometimes the result is to make the mother take on flesh, while the milk grows scanty. Moderate exercise is likely to increase the quantity of milk, but hard work decreases the proportion of protein. It is a matter of common knowledge that the amount of the secretion is increased by the addition of extra fluid to the regular diet, and a patient whose milk supply is small is always plied with milk, cocoa and gruel to stimulate the flow. While certain drugs have been shown to affect the milk, the various galactagogues which are so highly lauded in the claims of their manufacturers are of little value in increasing the secretion. It

must not be forgotten that the effect of some drugs is transmitted to the child through the milk, and that cathartics present a striking example of this fact. Scarcely less striking is the effect of grave anxiety or mental conditions, which may so change the milk that it becomes actually injurious to the child. The average composition of human milk is fat 4 per cent, sugar 7 per cent and protein 1.5 per cent, with about 87 per cent of water.

Care of the Nipples.—The care of the nipples bears an important part in the care of the breasts. If the nipples become sore or fissured, nursing is interfered with, since the act is so painful for the mother that she soon grows discouraged. Moreover there is always danger that an abrasion may serve as a portal of entry for infection. The simple precaution of washing the nipples with boric acid solution and carefully drying them before and after each nursing seems to be all that is required in the majority of cases to prevent the entrance of infection. In some hospitals a small pad of gauze is placed over the nipple and secured by narrow strips of adhesive plaster. If so desired, a little boric ointment can be applied on the gauze.

If in spite of such care the nipples become sore, the pain of nursing is relieved by the use of a nipple shield, which prevents the baby's mouth from coming in contact with the irritated surface. It must be remembered that the shield itself will add to the irritation as well as to the danger of infection unless it is carefully cleaned and kept in boric acid solution between nursings. Its use should not be continued longer than is absolutely necessary, since the rubber occasionally gives the child a sore mouth. As an application for sore nipples, the compound tincture of benzoin is an old and tried friend. Another of the old favorites is a paste of castor oil and bismuth. Balsam of Peru also aids

the healing. Compresses of boric acid kept on the nipples between the nursings have proved effective. Witch-hazel or alcohol will harden the surface. Deep cracks may have to be touched with silver nitrate or argyrol.

Retracted nipples make nursing difficult but rarely impossible. By dint of patience and perseverance the nipple can be gently drawn out in most cases until the baby can take hold of it. A nipple shield may help to solve the problem.

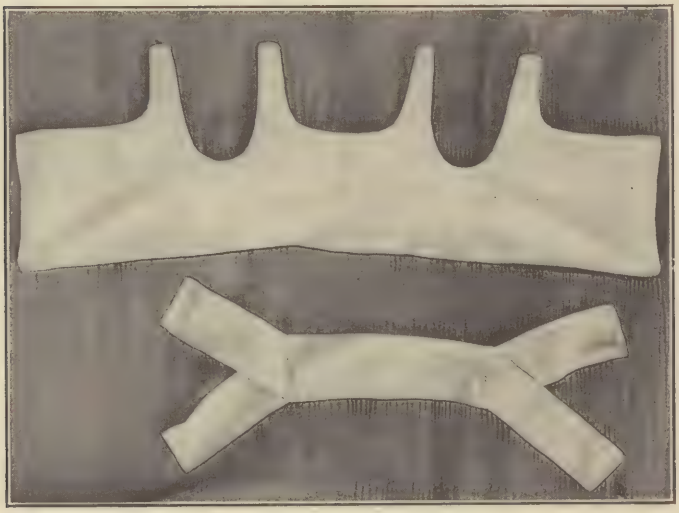

FIG. 81.—Breast bandages. (Bacon.)

When the child seems unwilling to use the shield, it may be encouraged if the rubber nipple is filled with milk or water at the start. All possible means should be exhausted before it is decided to take the baby off the breast.

Engorgement.—The engorgement of the breasts which comes with the establishment of the milk secretion is usually relieved by an ice cap and a saline cathartic. A supporting

binder should be applied. If the baby cannot empty the breasts, it may be necessary to use a breast pump, but this

FIG. 82.—Breast and abdominal bandages applied. (Bacon.)

FIG. 83.—Massage of the breast. (Bacon.)

should not be continued for any length of time. Massage is sometimes useful to bring the milk to the surface when

the child has difficulty in nursing. The breast is anointed with warm oil and rubbed gently but firmly by a stroking motion toward the nipple. Neither the breast pump nor massage should be tried without the doctor's orders. The nurse should also find out his views on methods of massage. Some claim that the distention of the breasts is due not to the milk alone but to lymphatic engorgement as well and that the massage must therefore be away from the nipple toward the periphery of the gland. In any case the manipulation must be extremely gentle, lest it set up an inflammation. Some physicians have abandoned the use of massage entirely.

Caked Breasts.—The familiar term "caked breasts" is used to describe a condition of apparent obstruction of the milk ducts in localized areas, which become hard, swollen and tender. The caking may be a forerunner of mastitis, if not properly treated. Here too the ice cap is effective, although some physicians prefer hot stupes to soften the breasts and others still use massage. A well-fitting binder for support is an important part of the cure.

Drying-up of the Milk.—If the child is stillborn, or if some condition in the mother makes nursing inadvisable, it will be necessary to dry up the milk secretion. This is no longer the troublesome process that it once was, when tight binders, breast pumps, massage, hot stupes and belladonna ointment combined to give the patient a season of discomfort. It is now recognized that the best results are obtained by the least manipulation. If a binder is used, it is simply as a support when the breasts are large and heavy and not at all for the purpose of compression. It is quite likely that the breasts will become full, tense and somewhat painful for about twenty-four hours, but ice caps applied continuously will usually relieve the pain and check the milk secre-

tion to some extent. The doctor may order an opiate such as codeine for the pain and Epsom salts for a couple of days to carry off the fluid from the body. Pumping the breasts or any procedure which would tend to stimulate the secretion of the glands is absolutely contraindicated.

Mastitis.—Mastitis is an inflammatory process in the breast tissue. It is caused by organisms which enter through the nipple as a rule, especially if cracks are present. The patient may infect herself through lack of cleanliness, or a careless nurse who neglects aseptic technic may be to blame. Moreover it must not be forgotten that any injury or irritation, as from squeezing the breast, rough handling in massage and the too-prolonged use of the breast pump, also plays an important part in starting an infection.

The inflammation is recognized by the classical symptoms, pain and tenderness, redness, heat, swelling and induration, which are at first localized in one small area. Fever is always present and a chill may usher in the infection. If discovered in time, the process can usually be aborted by giving rest to the breast and keeping ice caps on continuously. A supporting binder should be applied. Free catharsis is sometimes helpful. Ointments of ichthyol and belladonna and the clay mixtures of the type of the cataplasm of kaolin have met with varying results. The Bier suction apparatus, which was so highly recommended for this condition some years ago, has not proved a marked success. Massage and the breast pump have no place in the treatment.

If the inflammation goes on to the point of suppuration, hot applications may hasten the pointing of the abscess. The physician will then make an incision to evacuate the pus, and drain the cavity with gauze or a drainage tube, as the case may require. When the condition is far advanced, the breast tissue becomes fairly riddled with pockets of pus,

and through-and-through drainage will be necessary. The nurse will be expected to help with the subsequent dressings. It is hardly necessary to remind her of the extreme care which must be taken to avoid carrying the infection to the vagina of the patient. As long as there is pus in the breast, the mother must not nurse the child.

As in all other conditions, prevention is the important part of the treatment. Breast abscesses rarely appear when scrupulous cleanliness is observed and should be almost unknown in a well-conducted hospital or in the practice of a conscientious nurse.

Rest and Exercise.—Rest and quiet are essential after an exhausting labor, but in the average case the patient recovers from the fatigue of the experience in a surprisingly short time. It is, however, a mistake to keep her flat on her back for several days. Not only is it irksome for her, but if she remains too long on her back, there is a chance that the heavy uterus, pulling on its stretched ligaments, may sag backward until a posterior displacement results. After the first day the woman should be encouraged to turn from one side to the other, and by the second week of the puerperium she should be able to be propped up on pillows and a back-rest. If there is a tendency to a backward displacement of the uterus, the patient should be directed to lie on her face for ten or fifteen minutes several times a day. Some physicians make it a routine to have their patients assume the knee-chest position for several minutes a day from the end of the first week.

Many women complain that lying in bed makes them lose their strength, and there is something in this contention. For this reason bed-exercises have been devised to keep the muscles in tone and so prepare the patient for the return to the duties of her daily life. During the first days these

exercises include deep breathing and raising and rotating the arms. Leg movements are added by the end of the week, but are of course postponed if there has been a perineal repair.

According to a time-honored routine the tenth day is set for the patient's first day out of bed. This day is chosen simply because the uterus is normally once more a pelvic organ by this time. The physician will be guided by the height of the fundus in deciding on the day for the individual case, and if the involution is slow, he will keep the woman in bed longer. Certain obstetricians, especially the advocates of "twilight sleep," believe in getting their patients up within the first few days, but they are in the minority. Any dispensary out-patient service affords plenty of examples of women grown old before their time, with subinvolution, uterine displacements and other pelvic troubles as a result of getting up too soon after confinement.

The patient, as a rule, feels so well while she is in bed that she is likely to overestimate her strength, and she is often surprised to find herself feeling weak and "light-headed" on her first day out of bed. The nurse should always stay with her patient under these circumstances, to keep watch of her condition, as the woman will occasionally have an actual fainting-spell. The nurse must also see to it that the patient does not become too ambitious after she begins to get about the house. The tendency is almost always to do too much and see too many people.

Puerperal Infection.—Puerperal infection is the modern name for childbed fever, long known as the scourge of obstetrical practice. In the old days it was a veritable epidemic in hospitals, and even in the private practice of the most skilful obstetricians the toll of deaths was high. We know now that this dreaded disease was nothing more

nor less than septic infection, introduced by the carelessness of those in attendance and carried by them from one patient to another; but no one then knew what caused it, although many talked learnedly of noxious vapors, miasmata, atmospheric conditions, milk metastases and what not.

It was not until the end of the eighteenth century that it began to dawn upon a few thinkers that the disease might be a contagion. In 1843 an American, Oliver Wendell Holmes, brought out what seems to us to-day a most convincing paper on the "Contagiousness of Puerperal Fever," in which he assailed the disease in no measured terms as a private pestilence. His views met with opposition and invective, but he lived to see them vindicated through the discoveries of bacteriology.

Four years later Semmelweiss, an assistant at the great Maternity Hospital in Vienna, gave a more striking demonstration of the truth of Holmes's ideas. It was a matter of common knowledge that puerperal fever was far more prevalent in the hospital wards reserved for the medical students than in those attended by the midwives. In trying to find out why this should be, Semmelweiss had the happy thought that the students' practice of going directly from autopsy work to attend confinement cases might be at the root of the trouble. In 1847 he introduced the startling innovation of requiring a rough sort of hand disinfection, by making it a routine procedure for the students to wash their hands and soak then in chlorine water before making vaginal examinations. The result was a drop in the puerperal fever mortality from 11.4 per cent to 1.27 per cent by the next year. In spite of this brilliant proof of the correctness of his views, Semmelweiss, like Holmes, met with open hostility. Overcome by disappointment and chagrin, he finally became insane and, by a strange freak of fate, died

from sepsis following an infected wound. The work of Pasteur and Lister was needed to convince the world of the new truth.

Without going into the details of exact pathological classification, we may consider puerperal infection as divided into two general types. One of these, which still goes by the old name *sapremia*, might better be called an absorption toxemia, since it is the result of absorption from the decomposing material in the uterine cavity. Examples of this type are seen when bits of placental tissue, membrane or blood clot are left in the uterus or when there is some interference with the drainage from its cavity. The organisms concerned are those which produce decomposition and are normally present while the necrotic tissue of the mucous membrane is breaking down.

The other type is what is generally understood when the term puerperal infection is used, since it is a true infection, produced by the pyogenic organisms, especially the streptococcus, staphylococcus, gonococcus and colon bacillus. The organisms make their way up through the vagina into the uterus and attack the raw surface left at the placental site just as they would infect an open wound in any other part of the body, setting up an endometritis in what remains of the mucous membrane. The infection may pass quickly through the uterine wall into the peritoneal cavity, with a resulting peritonitis, or it may enter the blood stream, causing a general septicemia; a gonococcus infection nearly always travels along the mucous membrane into the Fallopian tubes to start an inflammation there. The more virulent the organisms and the weaker the patient's powers of resistance, the more rapid the extension and, naturally, the more severe the symptoms.

A typical case of puerperal infection shows itself about the

third day, with a chill, sudden rise of temperature to 102° or 103°F., rapid pulse and signs of prostration. There is often tenderness over the uterus, and if peritonitis is beginning, the characteristic abdominal pain, tenderness and distention will appear. If the trouble is caused by necrotic material in the uterus, the lochia will be dark or dirty reddish in color, foul-smelling and profuse. In true septicemia, on the other hand, the discharge is likely to be pale and odorless and so scanty that it is not to be wondered at that obstetricians of former days ascribed the disease to suppression of the lochia.

Treatment.—Preventive treatment is all-important. Puerperal infection is a preventable disease, if ever there was one, and all that is needed to drive it from our borders is to carry out conscientiously the rules of modern aseptic technic. Even to-day there still remain some people who try to excuse their neglect of asepsis by maintaining that it is useless to take such precautions when the patient is uncleanly in her person or her surroundings. It is true that a dirty or ignorant patient may infect herself by handling the parts or by using soiled dressings, in spite of the best efforts of doctor and nurse; but the splendid results of a well-conducted outpatient service in the poorest quarter of many a large city offer convincing proof that dirty surroundings make little headway in the face of clean obstetrics.

The nurse's part in the prevention of the disease is to see to it that she is in no way a carrier of infection. It should go without saying that an obstetrical nurse will avoid septic and contagious cases as far as possible, that she will thoroughly disinfect her person after attendance on such cases and that she will not go directly from them to a confinement. The modern nurse knows too that a focal infection such as a sore throat or a carious tooth may make her a source of

danger. The text-books still cite the well-known case of an unfortunate obstetrician who suffered from ozena and was thus the unwitting cause of a trail of puerperal fever in his practice. In her care of her patient the nurse must never relax her aseptic vigilance. In aiding the physician she must take the greatest care not to contaminate in the slightest way the obstetrical supplies and instruments. If she is not able to disinfect her hands while in attendance upon him, she should cultivate the habit of using sterile forceps.

A century ago bleeding and purging still held their own as methods of treating childbed fever, but as the conviction grew that the disease was really an infection in the uterus, they gave way to local measures of douching, packing and curettement. These, however, involved so much manipulation within the uterine cavity and, in consequence, so much disturbance of Nature's healing process that they often defeated the very end which they sought to accomplish.

The principle of the modern methods of treatment is to work against infection by destroying the organisms and raising the patient's powers of resistance. Unfortunately, in puerperal infection the attempt to fight the invading organisms directly with serum or vaccine has not been crowned with the success which was hoped for. Stress is therefore laid on supporting and stimulating the patient, and nourishment to keep up her strength is of prime importance.

Lowering the pelvis to secure better drainage and to keep the infection from ascending into the general peritoneal cavity is recognized as a valuable aid in the treatment. The Fowler position is therefore in common use for these cases. The patient can be raised on pillows or a bed-rest, or the head of the bed can be raised so that she lies on an inclined plane.

Salt solution supplied to the tissues is an important part of the treatment. It is usually given by rectum, according to the familiar Murphy-drip method. The solution, warmed to body temperature, is placed in a fountain syringe or other container, which is surrounded by hot-water bottles to prevent cooling. A clamp on the tubing regulates the flow as may be desired, generally to the rate of fifty to sixty drops a minute. At first this is readily absorbed and can be given almost continuously, but if the tube is irritating to the patient or if after a time she cannot retain all the fluid, it will be better to allow her intervals of rest. If the bowel becomes so intolerant that the solution is often expelled, hypodermoclysis should be tried.

Other measures will be determined by the patient's symptoms and the practice of the physician. If there is much abdominal distention and distress from the gas, the rectal tube may be passed or stupes applied to the abdomen; eserin and pituitrin are sometimes used. For abdominal pain an ice cap is often used, although some doctors prefer hot applications. For purposes of diagnosis the physician may wish to have a microscopical examination made from a cervical smear, a blood count made and a blood culture taken.

It must not be forgotten that rest is a powerful factor in the patient's recovery. The most excellent treatment may not accomplish the desired good, if the patient is constantly disturbed in the process. A wise nurse will carefully look over the list of things to be done and will so group them as to give the longest possible intervals of rest.

Puerperal Thrombosis. Thrombo-phlebitis. Phlegmasia Alba Dolens.—In this condition, familiarly known as "milk-leg," the circulation of the leg is partly shut off by the formation of a clot in one of the larger veins. While usually confined to one leg, thrombosis has been known to affect

both, in succession or even simultaneously. First, there is pain over the course of the vein, then the leg becomes swollen and tender and the skin white and glazed in appearance. If the thrombus is infected, there will be fever and rapid pulse.

The treatment is rest until the absorption of the clot is complete. The patient is put to bed, with the leg elevated, and is kept absolutely quiet to avoid embolism. The leg may be wrapped in cotton and various lotions and ointments applied to relieve the pain, but on no account should even the gentlest massage be employed. Convalescence is apt to be slow and tedious, and the leg may have a tendency to swell after the patient is up and about again.

Puerperal Insanity.— In most cases of puerperal insanity the strain of pregnancy and labor is only the last step for a patient already well on the road to mental derangement. The more strictly obstetrical cases follow eclampsia and puerperal infection.

The attack comes on within the first week or two after the delivery. After a period of deceptive calm, in which the patient seems perhaps unusually quiet and abstracted, she suddenly becomes excitable, even to the point of mania, or deeply melancholic. She may show a violent antipathy to the people about her and attempt to do them harm. In a moment of depression she may try to commit suicide. Because of these tendencies the patient must never be left alone for a single moment, and on no account should the baby be in the room with her.

In the majority of instances puerperal insanity tends toward improvement and recovery. The outcome is most favorable in the eclamptic cases, although entire loss of memory concerning the events of the confinement is com-

mon. Cases are on record in which the mother, after her recovery, has even refused to believe that the child is hers.

Subinvolution.—This is a condition of defective involution, which results from poor tone of the uterine muscle. The fundus, instead of sinking into the pelvis by the tenth day, is felt well above the symphysis, and the heavy uterus drags on its ligaments, sagging out of place and making pressure on the surrounding organs. Subinvolution is common among multiparæ who have had pregnancies in rapid succession. Getting up too soon after confinement is a frequent cause, and a dispensary out-patient service is sure to furnish many examples among the women who are doing their housework and hanging out the wash when the baby is but a few days old.

If the involution is slow, the patient must be kept in bed beyond the classic ten days until it is complete. Hot vaginal douches aid the process, and ergot, strychnine and hydrastis are often prescribed as a uterine tonic. Without treatment the condition is apt to become permanent, and old cases are little benefited by the above measures.

Final Examination.—Before the obstetrician discharges his patient, he will wish to make an examination to see that her pelvic condition is satisfactory. For this final examination the woman is placed in the dorsal position, preferably with her hips at the edge of the bed or table, and prepared as for any vaginal examination. The nurse should have in readiness whatever the physician will need for hand disinfection, also a gown and sterile gloves. She should always ask what will be required for the examination. Usually a speculum, dressing-forceps and pledgets will be all-sufficient, but some physicians insert a medicated tampon at this time.

CHAPTER IX.

OBSTETRICAL OPERATIONS.

Obstetrical operations are undertaken to hasten delivery in the presence of any condition which endangers the life of mother or child. The commonest indications are: (1) Delayed labor, due to inertia of the uterus or exhaustion of the mother; (2) danger to the child, as shown by failing heart tones; (3) malpresentations; (4) disproportion between the child and the pelvis, whether due to large size of the child or contraction of the pelvis; (5) obstetrical emergencies, such as eclampsia and hemorrhage.

Preparation for Operation.—Since obstetrical operations are, as a rule, undertaken during labor, as the occasion arises, and often under conditions when delay may cost life, any prolonged preliminary preparation of the patient is out of the question, except in some cases of Cæsarean section. Fortunately the routine care in a normal case includes emptying the bowels by an enema and either shaving or clipping the pubic hairs; moreover, the woman has usually taken only light nourishment since the beginning of labor, so that an anesthetic can safely be given her. In the average case all that is necessary, when the operation is decided upon, is to anesthetize the patient, place her in the most favorable position for the operation, catheterize her and make a better surgical field by cleansing the parts again and adding fresh sterile dressings. Catheterization should never be omitted, as a full bladder may act as an obstruction or receive some injury during the extraction of the child.

The anesthetic is practically always ether, unless there is some special indication for the use of chloroform or nitrous oxide and oxygen. Twilight sleep in itself is not sufficient for the usual operative procedures. Since prolonged anesthesia is particularly undesirable in obstetrical cases on account of its effect on the child, all possible preparations should be made before the ether is started, so that the patient will not be kept under its influence any longer than is absolutely necessary.

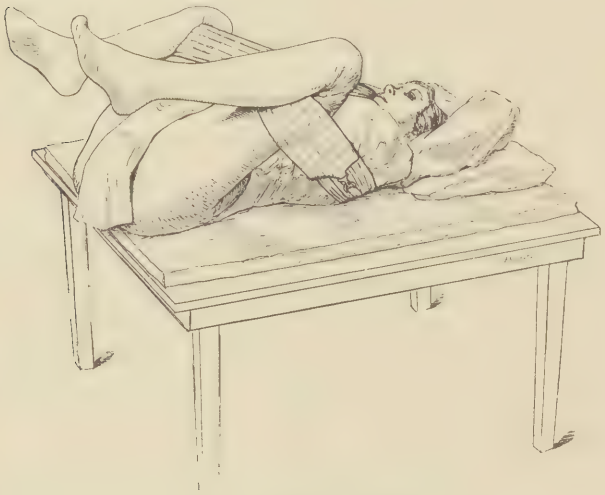

FIG. 84.—Robb's leg-holder in position. (Cragin.)

In all operations except Cæsarean section the patient lies on her back, with her hips brought to the edge of the bed or table and her legs held up by stirrups or some similar appliance. The average bed is too low for operative work, but a satisfactory operating-table can be fitted up from an ordinary kitchen table. For private work Robb's leg-holder is a

valuable asset in place of the stirrups and a sheet twisted into a sling is a practical substitute; sometimes members of the family or friendly neighbors may be enlisted as leg-holders, if they can be relied upon not to become too excited or nervous in the course of the proceedings. As far as possible the moving of the patient should be done while she is still conscious and able to help herself, but it is usually wiser to wait until she is relaxed under the anesthetic before holding or fastening her legs, as she may struggle and hurt herself during the "excitement stage." The operating field is arranged as for a normal delivery, with the addition of a sterile towel placed over the anus and held in place by a broad band of adhesive plaster. The obstetrician will designate the instruments which he will require; these will include instruments for the repair of lacerations which are likely to occur. It must be remembered that an operative delivery greatly increases the chances of postpartum hemorrhage for the mother and asphyxia for the child, and that it is therefore imperative to have everything at hand for the treatment of these complications.

Forceps.—Delivery by forceps is the commonest obstetrical operation. The instrument dates back only as far as the early part of the seventeenth century and was for more than a hundred years a secret known only to the members of the Chamberlen family who had invented it. Before their time the only method of delivery in the majority of difficult cases was by means of mutilating operations on the child, which sacrificed its life and often resulted in serious injury or even death to the mother as well.

The instrument is used to extract the child when the head is presenting. It has two separate blades curved to fit around the head and the handles lock in such a way as to ensure a firm grasp without exerting too much pressure. The opera-

tion is called high, mid or low, according to the position of the head in the pelvis, and the forceps are varied somewhat to meet the needs of the case. An instrument to be used

FIG. 85.—Simpson forceps. (Cragin.)

FIG. 86.—Elliot forceps. (Cragin.)

when the head is high in the superior strait must naturally have longer handles in order to reach far enough up into the birth canal, and a special attachment has been devised

which makes it easier to apply the traction in the axis of the pelvis and gives to the instrument the name of axis-traction forceps. The type of forceps most commonly used for the low and mid-operations is the Simpson; the best known of the axis-traction instruments is the Tarnier model.

The low forceps operation is easy for the obstetrician and often involves no more injury to the mother and child than may accompany a normal delivery; but the high opera-

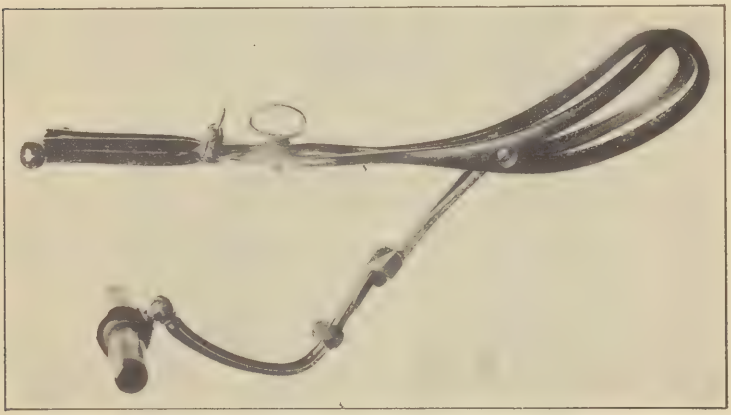

FIG. 87.—Tarnier axis-traction forceps. Traction handle attached. (Cragin.)

tion may mean a long, hard pull, with laceration of the tissues of the birth canal and perhaps serious result to the child from the pressure of the instrument.

The physician will usually tell the nurse which forceps to prepare, but if in doubt, it is always safe to sterilize both the axis-traction forceps and the Simpson (or whatever model the physician uses for the low and mid cases).

Induction of Labor.—Labor may be brought on by artificial means, after the child is viable, if the physician is convinced

that delay means danger to mother or child. Cases which might require such treatment would include: (1) Disproportion between the child and the pelvis; (2) toxemia, not

FIG. 88.—Voorhees's modification of Champetier de Ribes's bags. (Cragin.)

yielding to other treatment; (3) placenta previa; (4) certain heart, lung and kidney conditions. The procedure may be undertaken before full term or when the patient is apparently

at or even beyond term and does not fall into labor spontaneously. It must not be confused with the induction of abortion, before the viability of the child.

Various methods are employed, according to the needs of the case. If the patient is about at term, it may be enough to give her a full dose of castor oil, following it with quinine.

Fig. 89.—Syringe used for distending elastic bags. (Cragin.)

In a multipara, manual dilatation of the cervix or rupture of the membranes is occasionally successful. A far surer way is to introduce into the cervix and lower part of the uterus something which will act as an irritant and start up uterine contractions. This irritant may be: (1) Gauze packing; (2) a catheter or rectal tube; (3) a rubber bag,

which can be filled with water through a tube after its insertion. The first two are easier to put in, but the results are more uncertain. The bags, being larger, are harder to insert, but surer in their effect, and by their pressure against the internal os aid in the dilatation of the cervix after the contractions have begun.

The patient is prepared as for any vaginal operation. If she is a multipara with an open cervix, a small bag can be inserted without anesthesia. If a primipara, the cervix must often be dilated before the bag can be introduced, and anesthesia will than be needed. When there is sufficient dilatation, the bag, rolled as small as possible, is carried through the cervix on dressing-forceps, or better, on a special carrier with blunt tips. When it is well inside the internal os, a syringe or funnel is connected with the tubing of the bag and sterile water is then allowed to run in until the bag is filled. The tubing of the bag is then clamped or tied tightly to prevent the water from running out. Usually within six or eight hours uterine contractions have begun; if not, the effect of the pressure of the bag can be increased by attaching a one-pound weight to the tubing and letting it hang over the foot of the bed, so that it exerts a pull on the bag. The nurse should report when the pains begin. She should also look from time to time to be sure that the water is not escaping from the bag.

The instruments needed for this operation are: Two retractors, or a weighted speculum and an anterior retractor; a tenaculum; dressing-forceps; bags of different sizes; the carrier for the bag; two hemostats; scissors; a syringe or funnel for running the water in. The bags should be carefully tested beforehand for any leak. They should be thoroughly sterilized by boiling, a rule which also applies if a catheter or rectal tube is used. The only possible danger

from the operation is the chance of infection, and this is a remote one if aseptic technic is observed.

FIG. 90.—External version in a breech presentation. (Cragin.)

Breech Extraction.—Breech extraction is used whenever immediate delivery is necessary in a case of breech presentation. The patient is thoroughly anesthetized and the operator introduces one hand into the uterus, brings down the feet and breech and extracts the child according to the

mechanism described under breech presentations. The child is sometimes injured in the course of the rapid extraction,

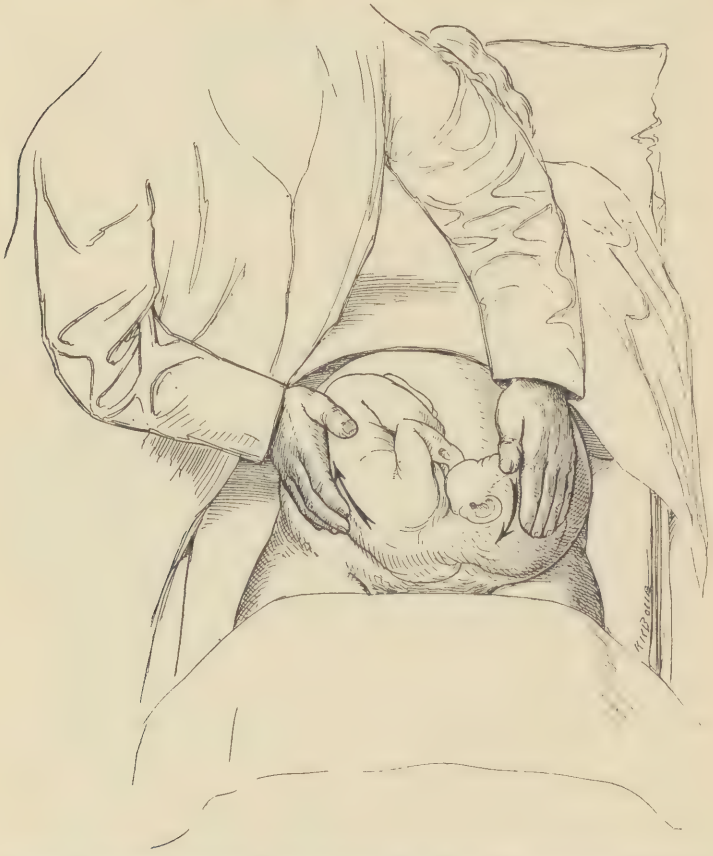

FIG. 91.—External version in a transverse presentation. Obstetrician above the pelvis. (Cragin.)

and fractures of the limbs and paralysis have been recorded. The nurse will make the preparations and stand ready to give aid, as already detailed under the above heading.

Version.—Version is the turning of the child in the uterus so as to change the presentation. It is called external, internal or combined, according as it is accomplished by external or internal manipulations or a combination of the two. In cephalic version the head is made the presenting part; in podalic version the breech and feet are brought down.

FIG. 92.—Combined or bipolar version. (Cragin.)

Whenever a breech or transverse presentation is found during a prenatal examination, external version is used in the attempt to correct the malpresentation. It is not always successful, and too much force must not be used, for fear of

causing some injury. If there is a tendency for the malpresentation to recur, the fetus can sometimes be held in its new position by a firm binder applied to the mother's abdomen, with pads at the sides.

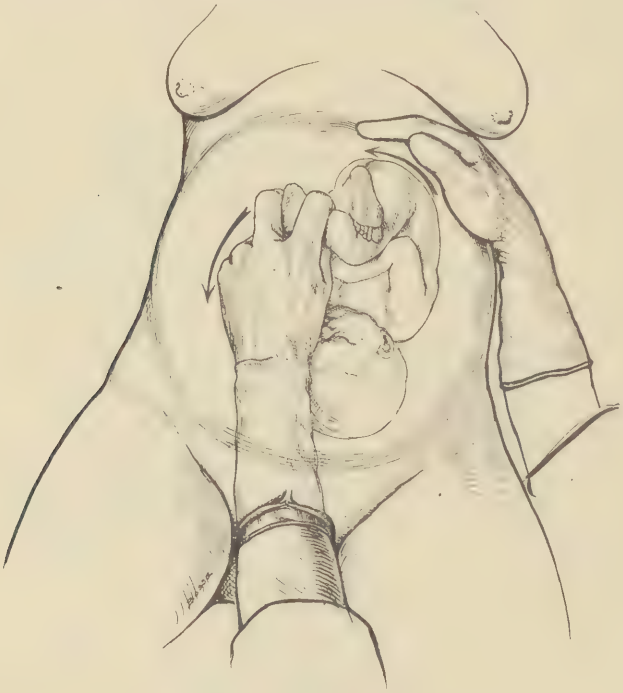

FIG. 93.—Internal version. (Cragin.)

Internal version can be used only during labor and after full dilatation of the cervix, since it involves passing the whole hand inside the uterus to turn the child. After the version is complete, the child is extracted by the feet, as in a breech extraction. This is the type of version which is

meant when it is said that a child is born by version. It is suitable not only for cases of malpresentation but also for cases in which immediate delivery is required and the head is too high for the application of forceps. It is a dangerous operation when the membranes have been long ruptured, because the uterus has had time to contract down on the child and it is hard to turn even a small fetus without injury to the uterine wall. Rupture of the uterus has resulted from the attempt to do version in such cases.

Vaginal Cæsarean Section.—In this operation the uterus is opened from below by an incision anteriorly in the cervix and lower uterine segment; if the child is large, a posterior incision is added. The operation is performed in cases of rigid or undilated cervix, when immediate delivery is necessary, as, for instance, when eclamptic convulsions come on before the patient is in labor. It differs markedly from the more familiar abdominal Cæsarean section in being contraindicated when the pelvis is small, because the child must be born by the natural passages after the uterus is incised.

The patient is prepared as for any vaginal operation. The instruments required are two tenacula, a scalpel, long straight scissors, six hemostats, two long clamps, curved needles, a needle-holder and small scissors. The usual sterile dressings should be provided, including uterus packing, as there is some danger of hemorrhage. In addition to these things everything should be in readiness for an operative delivery (usually by forceps), postpartum hemorrhage, and repair of lacerations. The instruments for perineorrhaphy are especially needed because it is sometimes necessary to incise the perineum as well as the uterus.

Cæsarean Section.—Cæsarean section is the well-known operation in which the child is born through an incision in the abdominal and uterine walls. It is called the Cæsar-

ean operation, not because Julius Cæsar was born in this way, but probably because the old Roman or Cæsarean law directed that it should be performed when a woman had died undelivered, so that she and her dead child could be buried separately. It is only within the last four or five hundred years that it has been practised upon the living woman to effect the birth of a living child, and even as late as fifty years ago the mortality was so high that it was undertaken only as a last resort in the most urgent cases. The development of modern aseptic technic in surgery has, however, wrought such a wonderful change that the operation is now in common use for cases (usually of pelvic deformity) in which delivery by the natural passages is either impossible or so difficult as to endanger the life of the child and perhaps that of the mother as well. It is also performed in certain cases of eclampsia, placenta previa and other conditions which may require immediate delivery.

If there is a chance that the child can be born without the operation, it is usual to let the woman go into labor, especially if she is a primipara, in order to see what the natural forces can accomplish before deciding to operate (to give her the "test of labor," in the common phrase). If it is clear from the start that Cæsarean section is the only possible solution of the problem, the operation is performed when the patient is at term, without necessarily waiting for the pains to begin.

The patient is prepared as for any abdominal operation, according to the technic of the surgeon in charge. The field of operation is shaved and the abdomen thoroughly cleansed with green soap and water, followed by bichloride solution, alcohol, lysol or whatever antiseptic is preferred. Some surgeons' routine includes painting the patient's abdomen with tincture of iodine just before the operation is begun.

It goes without saying that the bladder and rectum should have been emptied before the patient is brought to the operating-room; it is most undesirable to have the operation delayed by the catheterization of the patient after she is on the table. The abdomen is protected by the usual sterile sheets and towels. Gas or ether anesthesia is used.

The instruments needed are as follows:

2 pairs of scissors, one angled and one straight.
2 scalpels.
2 pairs of tissue forceps.
2 abdominal retractors.
2 peritoneal tenacula.
2 needle-holders.
18 to 24 hemostats (at least 6 long ones).
Needles and catgut, No. 1 and No. 2.
Cord scissors and two cord clamps.

The supplies will include sterile towels, gauze sponges, large and small, with some strung sponges, and plenty of hot salt solution. Everything must be in readiness for resuscitating the child and for controlling hemorrhage. A hypodermic syringe should be filled with ergot so that it can be given without delay just before the placenta is extracted.

The steps of the operation are as follows:

1. Median incision through the abdominal wall. For this the operator will need a knife, tissue forceps, hemostats and angled scissors.

2. Incision through the uterine wall. A fresh knife is used.

3. Extraction of the child. Have ready two long clamps to clamp the cord and scissors to cut it. The child is then handed to an assistant to be resuscitated if necessary.

4. Removal of the placenta and membranes. A sterile

pan must be ready to receive the placenta. A hypodermic injection of ergot is given while the placenta is being separated or earlier, as the obstetrician may direct.

5. Closure of the uterine incision. The uterus is wrapped in towels or large sponges wrung out of hot salt solution. Retractors may be needed. The muscular wall of the uterus

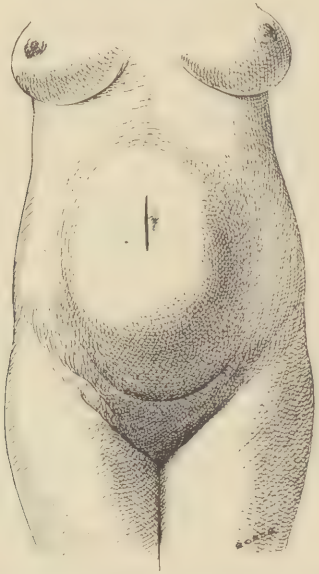

FIG. 94.—Cæsarean section. Site of abdominal incision. (Cragin.)

is closed with interrupted sutures of chromicized catgut No. 2 (one or two tiers, according to the technic of the operator,) and the peritoneal covering of the organ with a continuous suture of catgut No. 1. Round needles are threaded and placed in the needle-holders and handed to the operator as fast as possible.

6. Closure of the abdominal wound, according to the

usual method: (1) The peritoneum, with a continuous suture of catgut No. 1; then the muscle, with interrupted sutures of catgut No. 2; then the skin, with a subcuticular suture of catgut on a sled-runner needle, or interrupted sutures of silk-worm gut on straight or curved cutting-edge needles.

Sterile dressings are now applied, and held in place by wide strips of adhesive plaster. A firm abdominal binder is placed outside the dressing.

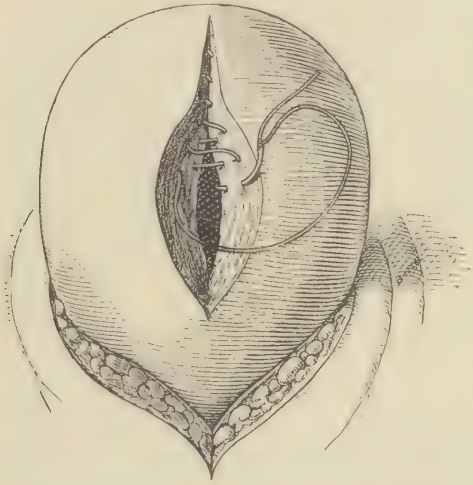

FIG. 95.—Closure of the muscular wall of the uterus begun.

The operation as here described is the classical Cæsarean section. The extraperitoneal and transperitoneal operations are recent modifications with a low uterine incision, which aim to lessen the danger of infection of the peritoneal cavity.

Many cases of repeated Cæsarean section are on record, and the operation has even been performed safely six times on the same patient. On the other hand conditions may

be present which make it dangerous for a woman to undergo a second operation. If so, the surgeon may be called upon to sterilize the patient before closing the abdomen. This is usually done by tying each tube in two places with linen thread and cutting between the ties. In such conditions as

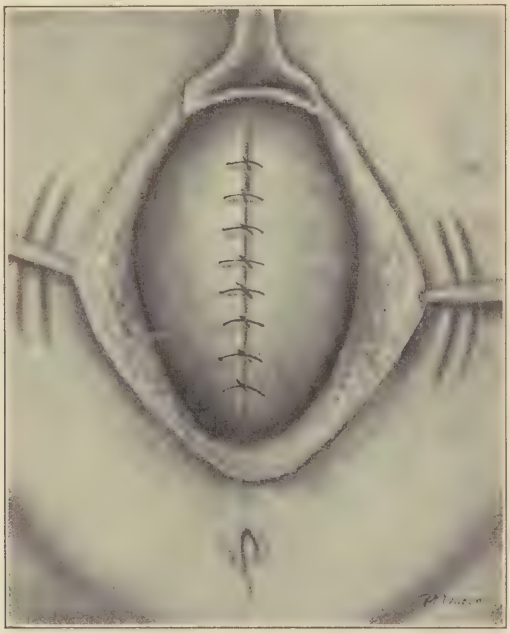

Fig. 96.—Closure of muscular wall finished. (Davis.)

uncontrollable hemorrhage, fibroid tumors of the uterus or infection, it may be necessary to remove the entire uterus after the extraction of the child. This is known as the Porro operation or Porro-Cæsarean section, because it was urged by Porro, in the days before asepsis, as a way to prevent or lower the mortality from septic infection.

After-care.—The after-care is the same as for any abdominal operation. The patient should be specially watched for any signs of shock, hemorrhage or beginning infection, and any untoward symptoms promptly reported to the physician. Usually the patient does well, the sutures are

FIG. 97.—Closure of peritoneal covering of uterus. (Davis.)

removed by the tenth day, she sits up in two weeks, and is up and about in three weeks. An abdominal binder should be worn to give proper support.

Besides the immediate dangers just mentioned, the ill-effects of a Cæsarean section are weakening of the uterine or abdominal wall and adhesion of the uterus to the abdom-

inal scar, with the possibility of rupture of the uterus at a subsequent pregnancy. The mortality in the hands of a good operator under favorable conditions is from 2 to 4 per cent.

Symphyseotomy. Pubiotomy.—These are operations for enlarging the pelvis when it is too small to let the child pass

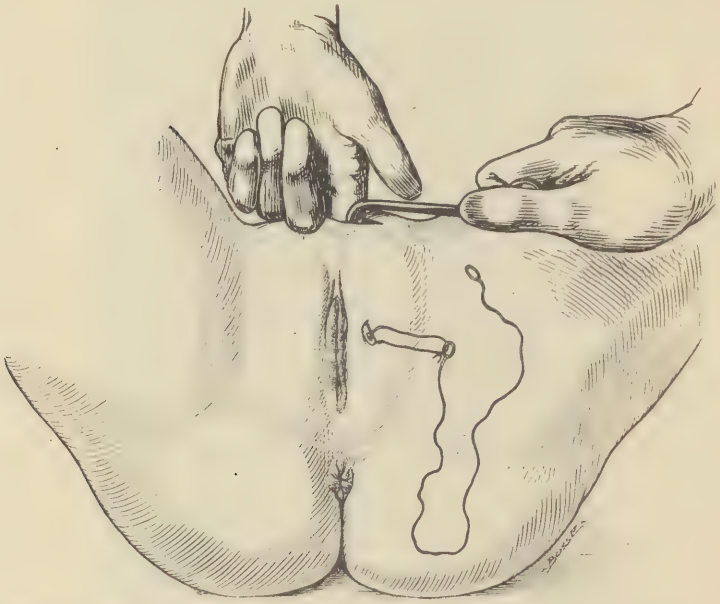

FIG. 98.—Pubiotomy, showing incision made and needle passed. (Cragin.)

through. Symphyseotomy, the older of the two, was first performed in 1773. It consists in cutting through the symphysis, at the joint, so that the pubic bones can gape apart and make more room in the pelvis. On account of the difficulty in securing good union at the joint, it has been largely abandoned in favor of pubiotomy.

In pubiotomy (also known as hebotomy and hebosteotomy) the pubic bone is sawed through just to one side of the symphysis by means of a wire saw, which has been threaded into a special needle and carried under the bone through a small incision. The operation can also be performed subcutaneously. When the bones have been stretched apart, the child is delivered by forceps or version, as the case may require. The chief dangers of the operation are hemor-

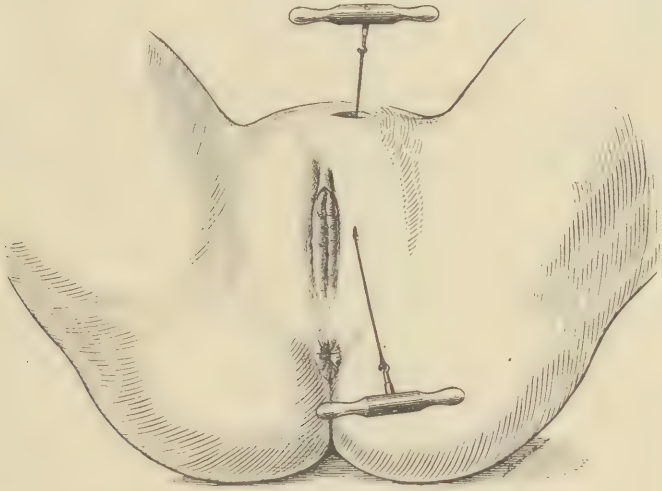

FIG. 99.—Pubiotomy. Flexible saw in place. (Cragin.)

rhage, which may be alarmingly profuse, and injury to the bladder; there is also a likelihood of deep lacerations of the soft parts. Later dangers are infection of the wound and imperfect union of the bone.

The instruments needed for a pubiotomy are a scalpel, two Gigli wire saws, a Doederlein pubiotomy needle, scissors, hemostats, needles, a needle-holder and suture material. There should be plenty of large sponges provided, in case

of hemorrhage. Two saws should always be in readiness, lest one break while sawing through the bone. Forceps for the extraction of the child and instruments and suture material for the repair of lacerations should also be at hand.

In order to secure satisfactory union of the bone, the pelvis is held firmly in position by a twelve-inch strip of adhesive plaster, passed around the hips. The after-care is complicated by the fact that the woman is really quite helpless during the first part of the puerperium and must be lifted a great deal. Being unable to spread her legs apart, she finds it hard to void her urine and move her bowels, and the nurse will sometimes find it a problem to keep the parts clean and the wound free from contamination. A special bed has been devised for use after the operation, but the more familiar Bradford frame is quite as convenient. The patient should be able to sit up within three weeks. In some cases there is only fibrous union of the bone, but this does not seem to interfere with walking and may even prove an advantage, by allowing permanent enlargement of the pelvis.

Embryotomy.—By this term is understood any mutilating operation on the fetus. In ancient times such operations offered the only method of delivery in difficult cases, and the child was sometimes extracted almost piecemeal. Forceps and version, Cæsarean section and pubiotomy, have rendered them unnecessary in ordinary practice, unless the child is a monstrosity or dead and too large to pass through the birth canal. The necessity of performing such an operation on a living child to save the mother's life is fortunately most exceptional, for it is one of the most dreadful things that the obstetrician is ever called upon to do.

Craniotomy, or perforation of the head, is the most familiar of these operations. The instrument used is a perforator of the Smellie scissors type or, if the head is unusually hard,

a trephine. After the hole has been made in the skull, usually through a suture or fontanelle, a long douche nozzle is introduced through it, and the brain washed out, to allow

FIG. 100.—Smellie's scissors. · (Cragin.)

the head to collapse. If the head is the presenting part, it must be extracted by means of the cranioclast, an instrument which at first sight suggests a pair of obstetrical forceps. One blade is, however, solid and toothed, and this is inserted

into the hole in the skull, while the other fits over the outside of the head, so that a firmer hold is secured than with the forceps. Craniotomy is performed in practically all cases of hydrocephalus (an accumulation of fluid in the child's head). The head collapses with the escape of the fluid and the child can then be extracted, sometimes by version, without the use of the cranioclast.

If the shoulders cannot be extracted by the usual methods, a blunt hook may be passed under the axilla, and traction made. If they are too broad to pass, one or both clavicles must be cut with a long pair of scissors. This operation is called *cleidotomy*.

In the rare cases of impacted transverse presentation with a dead child, it has sometimes been necessary to decapitate the fetus. A blunt hook, a sickle knife or a long pair of scissors is used.

Repair of Lacerations.—In spite of the obstetrician's best efforts it is not always possible to prevent lacerations of the perineum and vagina, especially if the patient is a primipara. The nurse should therefore have in readiness the necessary instruments, suture material and dressings, so that the repair can be done without delay.

Lacerations are classified as complete and incomplete. A complete tear is one which involves the sphincter of the anus and often the rectum as well, while an incomplete tear, however deep, stops short of the sphincter. Lacerations are also divided into tears of the first, second and third degrees, as follows:

First degree lacerations are superficial, involving the skin surface of the perineum or the mucous membrane of the vagina.

Second degree lacerations extend into the muscle of the perineal floor but not through the sphincter ani.

Third degree lacerations pass through the sphincter and sometimes through the rectal mucous membrane.

Lacerations of the cervix are fairly common, but for the most part they are slight and heal so well without suturing that their repair is not a routine procedure. If a cervical tear is deep enough to cause hemorrhage, immediate repair may be urgent to control the bleeding.

After a prolonged labor the tissues are sometimes so swollen and edematous that the obstetrician will prefer to wait until the next day before operating, but in the great majority of cases the repair is done at the end of the third stage of labor. Indeed, the sutures may even be placed while the doctor is waiting for the placenta to be expelled, and tied as soon as it has been extruded.

The patient lies in the dorsal or better, in the lithotomy position, with the buttocks brought to the edge of the bed or table. In a hospital the feet are held up by stirrups, but in a private house a leg-holder or a sheet may be used, or someone may be asked to hold the legs. If the laceration is very extensive, an anesthetic will be necessary, especially in the case of a complete tear; in most cases of first degree lacerations the patient will prefer to bear a few minutes' pain rather than to take ether.

The instruments required for an ordinary perineorrhaphy are tissue forceps, curved and straight scissors, six hemostats, a needle-holder, two retractors and dressing-forceps. The needles should include large perineal needles as well as the curved needles suitable for vaginal work. Chromicized catgut No. 1 and No. 2 are used for the vagina, and some operators use it for the skin surface also, while others prefer silkworm gut. The parts must be carefully cleansed before the stitches are placed, and sponges and square gauze will be needed for this purpose. During the operation the

nurse may be asked to assist by threading needles, holding retractors, sponging the field and handing instruments.

For a cervical repair two long tenacula will be needed in addition to draw down the lips of the cervix, and the nurse may be asked to hold these after they have been applied.

After-care of Sutures.—The best way to promote healing after a perineorrhaphy is to keep the sutures and the line of the repair as clean and dry as possible. This can be done by cleansing the parts, irrigating them with sterile water after micturition and defecation, and carefully drying them, wrapping the sutures in sterile gauze and changing the vulvar pads frequently. There is no apparent advantage to be gained from the use of antiseptic solutions in dressing the wound. If the repair is extensive, the patient should be cautioned against moving about in such a way as to put strain on the stitches; the old method of tying the legs together has been given up. If the parts become swollen or edematous, the stitches are likely to cut into the tissues, and the condition should therefore be reported to the doctor. It is usually treated by cold compresses of witch-hazel, boric acid or salt solution.

If there has been a complete laceration through the sphincter ani, the physician will probably give orders for the bowels to be kept locked for some days, lest the straining at stool should cause the sutures to tear through. An oil enema is given before the first bowel movement in order to soften the fecal matter.

Removal of Sutures.—In the ordinary case the perineal sutures are removed on the eighth day. After a superficial laceration good union will take place earlier than this. If the stitches are cutting, they may have to be removed on this account.

The patient is placed across the bed and the vulva and

perineum are cleansed in the usual manner. A good light is an important requisite. For the removal of the sutures the doctor will want only tissue forceps and a pair of scissors which cut well at the points. Some prefer a probe instead of the forceps to lift the stitches.

The catgut used in the repair of the vagina and cervix can usually be left to absorb and these stitches are therefore not removed.

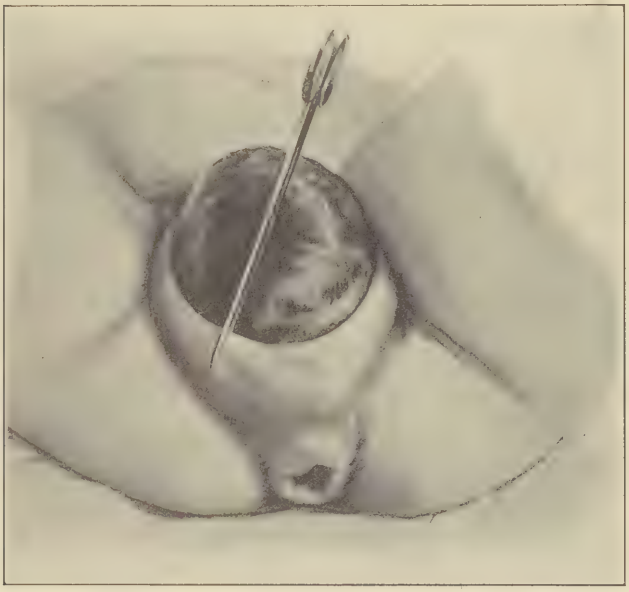

FIG. 101.—Episiotomy. (Bumm.)

Episiotomy.—This very minor operation is simply cutting the perineum when the vulvar opening is too small or the tissues too rigid to allow the child's head to pass without a laceration of the perineum. A single central incision may be made, or two oblique slits, one at either side of the median

line posteriorly. The repair of the resulting wounds is after the manner of any perineorrhaphy, but it is claimed that the healing is more satisfactory because they are clean-cut incisions and not ragged and irregular tears. The only instrument required for the operation is a pair of straight scissors, but the perineorrhaphy instruments will be needed for the repair afterward.

MINOR OPERATIVE PROCEDURES.

Douches.—Douches are used for the purpose of cleansing the vagina and the uterine cavity. They were formerly almost a routine part of the conduct of an obstetrical case, but their popularity has waned of late years, and they are now used only in special conditions, by the express order of the doctor. A douche is either vaginal or intra-uterine, according as the fluid is introduced into the vagina or the uterine cavity. Vaginal douches are given by the nurse, but intra-uterine douches by the physician.

As a preparation for the douche the nurse sterilizes a douche pan, a douche bag or other container and a glass nozzle, short or long, according as the douche is vaginal or intra-uterine. The solution will be prescribed by the physician. It may be sterile water or salt solution or an antiseptic solution such as lysol, bichloride of mercury, alcohol or potassium permanganate. The nurse should ask for precise directions when antiseptics are used, especially in the case of the poisonous ones, so that there may be no mistake about the strength of the solution and the amount to be used. Most douches are given at a temperature of about 100°F., just above the body temperature; when they are used for the purpose of applying heat to the pelvic organs or controlling a hemorrhage, the temperature is from 112° to

120°F. For a vaginal douche one to two quarts of the solution is the usual quantity.

Vaginal Douches.—These are sometimes prescribed for cases of gonorrhea during pregnancy, when the discharge is profuse. They were formerly recommended to soften and relax the parts during labor as well as to wash out any organisms which might have gained entrance to the vagina, but they have been practically abandoned at this time. In the puerperium they are of value when the patient has an offensive discharge and also in inflammatory conditions.

A vaginal douche is given with the patient lying on her back in bed. The parts are carefully cleansed as for any vaginal procedure and the douche pan is slipped under her. The greatest care must be taken to prevent any material from being carried up from the vulva into the vagina. Before the nozzle is introduced, the fluid should be allowed to run through it, so that no air will be forced in. The nurse spreads the labia apart with the fingers of one hand, opening the vagina as wide as possible, and then gently slips the nozzle in, pointing it obliquely downward. If any material is washed out, it should be saved for the physician to see, if he so desires. After the douche has been given, the vulva is dried carefully and a pad applied to absorb any fluid which may ooze out from the vagina later.

Intra-uterine Douches.—Intra-uterine douches have their greatest value in checking postpartum hemorrhage. They were formerly used in puerperal infection as a method of introducing antiseptic solutions into the uterus, with the idea of destroying the infecting organisms. Since it has been shown that these organisms are buried too deep in the uterine wall to be reached even by a strong solution, intra-uterine douches have been omitted from the treatment. Cases of fatal poisoning have been reported following the use of solutions of carbolic acid and bichloride of mercury. Rarely

an intra-uterine douche may be given to wash out retained lochia or clots from the uterine cavity, but it is seldom advisable. There is danger of absorption from the decomposing material as it is spread over the surface of the lining membrane, and even a possibility that it may be forced up into the tubes. A sudden rise of temperature or a chill may result from a douche.

The preparations for the douche include: (1) A sterile container, best of glass or white agate, although in an emergency a fountain syringe will serve every purpose; and (2) a thermometer for testing the heat of the solution. It is never safe to guess at the temperature of a douche to be used in a case of hemorrhage.

When the douche is given for the treatment of postpartum hemorrhage, the patient is probably already lying with her buttocks brought to the edge of the bed or table, with a Kelly pad or similar appliance beneath her. In the puerperium, she should be placed across the bed, and the pad or pan used. The vulva is cleansed as usual, and the physician will generally douche out the vagina before inserting the long uterine nozzle. It is wise to have all preparations for a hot intra-uterine douche ready in every case of operative delivery, as hemorrhage of at least moderate grade is not uncommon. Delay in the treatment of such hemorrhage is sometimes disastrous and even fatal.

Packing or Tamponade.—Tamponade of any part of the birth canal may be performed for the purpose of arresting hemorrhage. It is most often used in postpartum hemorrhage, when the entire uterine cavity must be tightly packed with gauze. In a case of hemorrhage from abortion or placenta previa the packing is introduced into the vagina and perhaps into the cervix as well.

Uterine packing should be from four to six inches wide. It is usually cut in six-yard lengths and packed into a glass

container which can be kept tightly closed, but it may also be rolled and wrapped in a square of muslin and the whole packet sterilized. The instruments needed for the introduction of the packing are a speculum or retractor, a cervical tenaculum and a pair of long dressing-forceps. In a case of postpartum hemorrhage, when every moment counts, the obstetrician will not wait for these instruments to be boiled but will use his hand in packing the uterus. Indeed, some physicians prefer the hand to the dressing-forceps, because with it they can feel whether the gauze is being carried to the very fundus. The patient lies in the dorsal position and is prepared as for any vaginal procedure. After the tamponade she must be carefully watched for signs of internal hemorrhage, as the uterus may relax even when filled with gauze, although the bleeding cannot be detected externally until the packing has become saturated. If the hemorrhage is controlled, the packing can be removed in from twelve to twenty-four hours.

Curettement.—This operation is indicated in cases of abortion when the uterus must be emptied. It formerly played an important part in the treatment of puerperal infection, but is now limited to the cases in which there is too much decomposing material in the uterine cavity to come away with free drainage and is rarely used, even in these.

Curettement may be performed with the finger or with a metal instrument. In abortions it is often necessary to dilate the cervix before curetting. The patient is prepared and anesthetized as for vaginal operation. The instruments needed are retractors or specula, tenaculum, uterine sound, uterine dilator, curettes and the outfit for an intrauterine douche. Gauze packing is sometimes inserted after a curettage. All material that is removed should be saved for the doctor's inspection and perhaps for laboratory examination as well.

CHAPTER X.

THE NEWBORN BABY AND ITS CARE.

The daily chart for the baby will include the following data: The temperature; the weight; the condition of umbilicus, eyes, mouth, genitalia, buttocks, skin; the bowel movements, their number and character; urination. Under the heading "remarks" the nurse will note any special condition which requires attention. For hospital charts it is a great convenience to have under the entry of the weight three divisions as follows: Weight at birth, weight yesterday and weight to-day.

Temperature. Pulse. Respiration.—The first record on the baby's chart will be the temperature. At birth this is often subnormal, as might be expected, when we consider how much colder the outside world is than the interior of the mother's body; but the child soon becomes adjusted to its new surroundings. After two or three days a rise of temperature above the normal is sometimes noticed, which is often referred to as a "starvation temperature" and seems to be due to the fact that the baby is not yet getting what it needs from its mother. This inanition fever soon passes away as the mother's milk becomes more abundant.

There is nothing notable about the pulse, except that it is a little slower than the fetal heart has been. The respirations are about 30 to 40, but are very variable. A child which has been asphyxiated must be carefully watched for any changes in pulse, respiration and color, and the condi-

tion at once reported to the doctor. If it is in a hospital, the oxygen tank should be kept close at hand for use in an attack of cyanosis.

Weight.—The next note will be the weight, a point of prime importance to the baby's family. In a hospital the weighing is done daily; in a private home this is not routine, because the scales are not always available or reliable. Moreover, it is apt to make the mother anxious if she follows the daily fluctuations too closely.

The average weight of the newborn infant is from seven to seven and one-half pounds. Although it varies within rather wide limits, eleven pounds can be set as the maximum, barring exceptional cases. One should always be chary of believing the tales of twelve- and fifteen-pound babies, which are recounted by proud parents.

During the first few days of life the weight goes down steadily, as much as one-half to three-quarters of a pound being lost in many cases. This initial loss is not surprising, since the child is not getting any nourishment from its mother and is losing actual weight in its bowel movements and urine. As soon as the mother's milk comes in and the baby begins to nurse well, the loss is quickly made up, and and by the tenth or twelfth day the birth weight has been regained. From this time on, a gain of an ounce daily is the rule in the first month.

Umbilical Cord.—The stump of the umbilical cord becomes hard and dry and, in most cases, sloughs off within the first week. The small granulating area which remains quickly heals over. The main points in the care of the cord are to keep it dry and surgically clean. Any dressing which accomplishes this will be satisfactory. It is not even necessary to change the original dressing for three or four days unless it becomes wet or soiled, but it is safer to examine

the umbilicus each day and apply a fresh dressing of sterile gauze. Various cord powders have been suggested to hasten the separation. One of the best is salicylic acid and starch powder, 1:4. Aristol also gives good results, and boric powder is often used. Alcohol has been a favorite dressing of late years. Iodine is also used. The stump will dry more quickly if the powder is applied about its base.

FIG. 102.—Umbilical hernia.

The physician's attention should be called to any secretion or offensive odor from the umbilicus or redness about it, as these may be signs of a beginning infection. The nurse must not try to improve on Nature's process by pulling or clipping the stump loose from its base; she should handle it as little as possible and only with clean hands, remembering that asepsis is as necessary in the care of the cord as in the dressing of any wound and that many a baby has died of septic infection which gained entrance through this channel.

Umbilical Hernia.—Newborn babies often show a tendency to a slight protrusion at the navel, which may develop into an actual hernia unless proper care is taken. Treatment is unsatisfactory before the cord has dropped, but after the umbilicus is thoroughly healed, a small pad of gauze or cotton and a wide band of adhesive plaster make an effective dressing. The adhesive strip should be applied snugly enough to hold the recti muscles together.

Fig. 103.—Adhesive plaster dressing for umbilical hernia.

Eyes.—Even though the Credé treatment for the eyes may have been used at the birth of the child, there is always the possibility that it has not been able to check a virulent infection or that the baby may acquire an infection from the mother later in the puerperium. For this reason the condition of the eyes should be carefully noted as a part of the daily routine and any discharge reported to the doctor.

A slight sticky discharge at the corners of the eyes is usually without significance and soon clears up after frequent flushing with boric acid solution. The silver catarrh

which sometimes results from the use of silver nitrate in the Credé treatment may set up considerable inflammation.

Gonococcus Infection. Ophthalmia Neonatorum.—The typical gonococcus infection, or ophthalmia neonatorum, makes a picture which is not soon forgotten. The lids are swollen and edematous and tightly closed; at the slightest attempt to separate them, thick green pus comes welling out. The mucous membrane of the conjunctiva on the inner side of

Fig. 104.—Ophthalmia neonatorum. (Bacon.)

the lids is red and inflamed—"beefy" is the term often used to describe its appearance. If the condition is allowed to go on without proper treatment, the infection attacks the cornea, ulcers form and blindness results.

A baby with gonorrheal ophthalmia should have a special nurse, since it needs almost constant attention and there is moreover always a chance that the infection may be carried to others. If this cannot be arranged, the nurse in charge must never for a moment forget the danger. The child

must be isolated as in any contagious disease and the nurse must observe the most rigid precautions, including careful hand disinfection after handling it.

In general the treatment consists in frequent flushing of the eyes to wash away the pus; hot or cold compresses to the swollen lids; and argyrol, 25 per cent, or some similar preparation of silver, dropped into the eyes at stated intervals. The details of the treatment will vary according to the practice of the physician. Gonococcus vaccine is sometimes administered in stubborn cases. The nurse should make it a point to have all directions fully written out, as a mistake may be disastrous.

If only one eye is affected, careful watch must be kept for signs of beginning trouble in the other. The plan of sealing the latter with a pad of gauze or cotton has the drawback of making it more difficult to examine the eye at frequent intervals. The baby should always be laid on the affected side and during the treatment the head must be turned so that there is no possibility of discharge or solution running into the sound eye.

Care of the Mouth.—The practice of cleaning the baby's mouth with a piece of gauze before and after each nursing is being discarded because of the injury to the delicate mucous membrane which is almost sure to result from such frequent rubbing. It is enough to swab once a day with a cotton stick dipped in boric acid solution, and even this must be done gently. The mouth must be inspected daily for erosions or sores.

Thrush.—This rather common form of stomatitis in young infants is characterized by milk-white patches on the mucous membrane of the mouth and tongue, which leave an abraded surface when removed. It is caused by a thread-like fungus which can be seen under the microscope. This fungus is

found in the air, ready to attack any portal of entry which may be afforded by an erosion of the mucous membrane, such as might result from rough cleaning of the mouth. Thrush is usually due to lack of cleanliness and is often seen in babies who are allowed to suck pacifiers and dirty rubber nipples. It is so contagious that it will run rapidly through a nursery unless great care is taken.

The treatment is first of all preventive. If the condition appears in spite of precautions, the mouth should be gently swabbed with pledgets of cotton soaked in a solution of borax or bicarbonate of soda, to remove the white flakes. An occasional application of argyrol will hasten the cure. If the child is being fed with the bottle, the nipple may cause so much irritation that a dropper must be used for two or three days. As a rule, thrush is easily controlled, but in a weak or sickly infant it may be a long process, as the fungus affects the digestion.

Bathing.—If the baby has been well oiled to remove the vernix and warmly wrapped in blankets, it can wait several hours for its first bath. It is not given a full bath, that is, it is not put in the bath-tub, until the cord has separated and the umbilicus is completely healed. Instead, it is held on the nurse's lap or laid on a table, and washed with soap and water, great care being taken not to wet the cord.

The wash-cloth should be of soft material, like gauze or cheese-cloth, made up into a pad, with no raw edges to fray or irritate. Castile soap has long been considered the most satisfactory for the baby's bath; fancy soaps are to be avoided. The temperature of the water should be about 105°F., and a thermometer should be used to register it. The nurse's hand has been too long inured to extremes of heat and cold to be a reliable guide. If no thermometer is available, she should test the water on her wrist or forearm.

It should be needless to warn against handling the baby roughly or irritating its delicate skin by too vigorous rubbing. When a sponge bath is given, the child must be kept covered as much as possible so that it may not become chilled. The body is carefully dried and lightly dusted with powder, particular attention being paid to all the creases of the skin. It is a mistake, however, to suppose that powder liberally shaken into these creases will replace the drying, as it only cakes and causes irritation. Special care must be taken to remove any smegma which may have accumulated about the genitalia; the anus and the region around it must be most thoroughly cleansed. As a part of the bath we may include swabbing out the mouth and nostrils with cotton sticks dipped in boric acid solution. This is to be done with extreme gentleness, as the mucous membrane is easily abraded. Flushing the eyes is no longer considered a necessary part of the daily routine; wiping them with cotton pledgets wet with boric acid solution is sufficient.

Clothing.—The clothing for the newborn baby should be light and warm and simple to adjust. The outfit consists of a shirt, band and diaper, a petticoat and a slip. The shirt will probably be of cotton or cotton and wool, according to the season; all-wool shirts are likely to shrink in washing. The band is a strip of flannel, fifteen to eighteen inches long, and four to five in width. The diaper is generally of birdseye; the canton flannel which is so often used is apt to become rough and scratchy after washing. Cheesecloth makes a particularly soft diaper. The petticoat hangs from the shoulders, according to the Gertrude or princess model, or has a body attached to it. The slips for the first few weeks should be of the simplest; the prettiest ones are better saved until the baby is a little older and does not soil and wet itself so often. Pins should be eliminated from the clothing

as far as possible, by substituting buttons and tapes. A method has even been devised for fastening diapers with tapes.

Bowels.—Mention has already been made of the meconium, the material which fills the intestines of the fetus during intra-uterine life. It may be some days before all traces of this disappear, but as the baby begins to take nourishment, the dark-green of the meconium is replaced by the golden-yellow color of the normal infant stool. A healthy baby's stools are neither formed nor liquid, but soft and pasty in consistency and homogeneous in character. If the food is not well digested, white curds are found, which may be composed of either fat or casein. Mucus gives the stool a stringy, glistening appearance. Variations in color are common. Long tradition has made the green stool a source of alarm. It must be remembered, however, that during the transition from the meconium to the normal bowel movement a green color is to be expected, and that even a yellow stool, after exposure to the air, may become green through oxidation processes. A dark-brown color may indicate the presence of blood. If the stool shows anything out of the normal, it should be saved for the physician's inspection.

It is hardly necessary to state that the child's bowels should move every day. The number of stools, even in a healthy baby, may vary from one to four, but is usually two or three. In case of constipation an enema is given by means of a soft rubber bulb. Laxative drugs are better omitted. Calomel and castor oil are given only by order of the physician. As the baby grows older, olive oil or milk of magnesia will be useful in overcoming a constipated habit. Colon lavage is indicated when a thorough cleansing of the lower bowel is necessary, as in cases of irritating or mucus-con-

taining stools. It is also employed to bring down the temperature, in febrile conditions.

FIG. 105.—Colon irrigation.

A colon lavage is best given with the baby lying on its back on a table, with its buttocks close to the edge. The hips are a little elevated, and a piece of rubber sheeting is laid under them, so arranged as to carry off the water and other

material into a pail which stands on the floor. The ordinary fountain syringe can be employed, but the tubing is too long. In a hospital the irrigation is usually given through a glass funnel attached to a piece of rubber tubing ten or twelve inches long. A hard-rubber or glass tip should not be used but a soft-rubber catheter, which can be connected with the tubing by means of a glass cuff. The catheter must be inserted gently and not more than a few inches. The best solution for the flushing is salt solution at body temperature. Only two or three ounces are allowed to run in at one time, but the irrigation is repeated until the fluid returns clear.

Urine.—The kidneys secrete a small amount of urine even during the intra-uterine life of the fetus, and as a general rule the child begins to void within a few hours of its birth. The first urine is apt to be rather concentrated and often stains the napkin a light reddish color; uric acid crystals may be present which make micturition slightly painful. This condition soon passes off as the normal secretion is established, especially if the baby is given water to drink.

The fact that in some cases no urine is passed for twenty-four hours may be a source of anxiety to the family. This is usually because the secretion is scanty or delayed, although sometimes the bladder is full and the child seems to lack the stimulus to empty it. Only exceptionally is the trouble due to actual malformation or obstruction. Hot wet compresses over the bladder and kidneys are used to bring on the flow of urine, and sweet spirits of nitre is a favorite diuretic. Probably time would cure most of the cases unaided.

Once the secretion is well established, there is no longer any cause for apprehension on the score of scanty urination. As it is nothing uncommon for the newborn infant to void from twelve to twenty times a day, the problem now is how

to keep the child dry and clean. The nurse will, of course, remember the importance of changing the diapers frequently lest the urine irritate the baby's skin.

Genitalia.—If the child is a boy, part of the daily care is the retraction of the prepuce, so that the smegma which accumulates at the base of the glans penis can be wiped away. Sometimes the foreskin is so tight that it constricts the glans when retracted, or perhaps it cannot be pushed back all the way. In such a case the nurse must not use too much force or irritate the tissues by too prolonged manipulation. She should report the condition to the physician, who may be able to correct the trouble by stretching the prepuce or breaking up adhesions which may be present. For this procedure a probe and perhaps a hemostat will be needed, and pledgets of cotton or gauze. Some doctors apply olive oil afterward.

If the phimosis is so marked that the foreskin cannot be retracted satisfactorily, the baby should be circumcised while it is still young, to prevent trouble later. Some physicians advise circumcision in every case. It is well known that the Jews consider the operation a religious rite, to be performed on the eighth day of the child's life. For this reason the nurse must remember not to retract or stretch the prepuce of a Jewish baby.

In the care of a girl baby too, special attention should be paid to cleansing the parts in order to remove the smegma. A slight mucoid discharge from the vagina is sometimes seen, but is usually of no serious import. If the discharge is purulent, profuse or irritating, it should be mentioned to the doctor, who will probably wish to make a smear for microscopic examination, especially if the mother has a discharge. Sterile slides and cotton sticks should be pro-

vided for this purpose. A bloody discharge which is wrongly termed precocious menstruation may occasionally appear, for a few days, but does not recur. The only treatment needed for the simpler conditions is to keep the parts clean by wiping away the discharge with pledgets wet in boric acid solution. A true gonorrheal vulvo-vaginitis will require special treatment.

Circumcision.—This operation consists in cutting away enough of the prepuce to prevent the possibility of constriction of the glans. The foreskin is drawn forward with hemostats and cut across with a sharp knife, after the glans has been protected by a special clamp. The mucous membrane which lines the prepuce is then slit anteriorly and trimmed off even with the skin. Sutures of catgut No. 00 are generally used, although the Jewish rabbis take no stitches. A sterile gauze dressing is applied. The nurse must be on the lookout for hemorrhage afterward, as a slight but continuous oozing may follow the operation.

Skin.—The skin of a newborn infant is so tender and delicate that it is easily irritated, even by heat or perspiration. A fat baby often becomes chafed in the creases of its skin. The region about the thighs and genitalia, where the diaper rubs, is especially likely to become irritated, and for this reason, if for no other, wet diapers must never be allowed to remain on the child, although it requires constant vigilance to keep them changed fast enough. In cases of intestinal indigestion with acid stools the buttocks may become inflamed and sore, even though every effort is made to change the napkins promptly. Among ignorant people and even among those who ought to know better, a frequent source of trouble is the pernicious practice of drying wet diapers and putting them back on the baby without washing

them. It certainly should not be necessary to tell a nurse that the napkins must be thoroughly washed and rinsed before they are used again. The rinsing is an important part, because washing-powder or a strong soap may be in itself a cause of irritation.

It is not uncommon for the skin to dry and peel when the child is a few days old. While most cases are without significance, the desquamation is sometimes similar to that after scarlet fever and is counted among the skin diseases of the newborn. Scaling of the skin in the region of the umbilicus may follow the use of cord powder, especially if the powder contains much salicylic acid.

If the baby has a tendency to scratch its face, the nurse must see to it that its nails are kept short. No attention should be paid to the superstition that it is unlucky to cut them, except to reassure the mother, if she is troubled on this point. It will sometimes be necessary to cover the child's hands with mitts.

Among the actual eruptions to which the baby is subject are the familiar "prickly heat" and the fine red rash known as red gum. Some forms of skin trouble are due to digestive disturbances; the skin lesions of congenital syphilis will be described under that heading.

Talcum powder or a similar dusting power is commonly used to prevent chafing, but unless it is very fine, it may become caked by the moisture of the parts and only add to the trouble. Oil is often better. For sore buttocks a simple ointment like vaseline or boric ointment will usually serve to protect the skin from further irritation and hasten the healing. If the condition is serious or caused by specific infection, special measures will be needed, as the physician may prescribe.

FEEDING.

Breast-feeding.—It cannot be too strongly emphasized that the best food for a newborn infant is its own mother's milk. Although the milk secretion is not established until about the third day of the puerperium, it is best to begin putting the baby to the breast as soon as the mother is rested from the strain of labor. In this way the child becomes accustomed to the act of suckling by the time the milk actually appears, and perhaps receives some benefit from the small amount of nutriment and reputed laxative action of the colostrum. It will be enough to let the child nurse three or four times a day at first, but after the milk comes in, feeding at regular intervals is a rule to be strictly enforced.

As there are pronounced differences of opinion as to the interval between the feedings, the nurse should make it a point to find out the routine preferred by the physician in charge. In general it may be said that the smaller and weaker the child, the shorter should be the interval, and that from two to three hours is the average. The schedule of feeding is usually from 6 A.M. to 10 P.M. A newborn baby must often be nursed twice during the night, but it can soon be trained to take only one feeding, and as it grows older, this too can be dropped out, so that the child will sleep through the night without the disturbing its mother. If it wakes, it can be given a little water, and if it finds that nothing else is forthcoming, it will soon decide that it is not worth while to wake for that.

The length of time that the baby should nurse will depend on the needs of the individual child. Naturally a large, hearty infant must have more nourishment than one who is small and weak. Moreover, it requires but little observation to show that some infants nurse slowly, even dropping off to

sleep from which they must be roused to complete their work; while others gulp down their food so fast that they swallow air and take more milk than their stomachs can hold, and hiccough and regurgitate in consequence. The amount of milk in the mother's breasts and the ease with which they can be emptied add another factor to the problem. Perhaps fifteen minutes may be mentioned as the average time that the baby should remain at the breast. If there is any question as to the quantity that the child is getting, this can be settled by weighing the infant before and after nursing.

Most babies take naturally enough to nursing, but it will often fall to the nurse to teach the infant and its mother how to manage the process, especially if the mother has had no previous experience. The woman should lie on her side, supporting the baby in the hollow of her arm so that it can easily reach the nipple. It is often necessary to coax the infant by putting the nipple into its mouth. Some babies persist in falling asleep before they have finished nursing, but this habit must not be permitted. Nor should the child be left so long with its mother that she herself goes to sleep, as there is very real danger that she may smother the baby. Absolute regularity is the secret of success in establishing a proper habit of nursing.

Artificial Feeding.—Artificial feeding is too large a subject to be taken up in detail in a text-book of obstetrics and it will therefore be enough to lay down merely a few general considerations. The obstetrical nurse meets comparatively few cases in which the child must be exclusively bottle-fed from the start, because, as has been already pointed out, few woman are unable to nurse their babies. The matter of artificial feeding as she sees it resolves itself into additional feeding for an infant whose mother's milk is deficient in

quality or quantity. This is often only a temporary measure, because after the mother is up and about, the milk will probably improve and increase until there is no further need of the bottle.

It is well known that undiluted cows' milk cannot be given to young infants as a substitute for mothers' milk, partly because its percentage composition is different, but also because its fat and protein are in a less digestible form. The composition of cows' milk as compared with that of human milk is as follows:

	Human milk. Per cent.	Cow's milk. Per cent.
Fat	4.00	4.00
Sugar	7.00	4.75
Protein	1.50	3.50
Salts	0.20	0.70

The formulas for a healthy baby in its first month will vary from 2 to 3 per cent of fat, 0.5 to 1 per cent of protein, and 5 to 6 per cent of sugar. Premature or sick infants will require special modifications. The physician will decide on the proportions of the milk mixture and give directions as to its preparation. The nurse should always find out from him whether the milk is to be used raw, boiled or pasteurized. It is certainly unnecessary to go into the familiar details of the keeping of the milk on ice and the sterilizing of bottles and nipples. The nurse also knows well that the mixture should be warmed almost to body temperature before each feeding. She sometimes forgets, however, how quickly the milk cools in the bottle and how often cold milk is responsible for digestive upsets. Whenever possible, she should be with the baby until it has finished its feeding. If the child is left alone, it may fall asleep or lose hold of the nipple. On no account should it be allowed to suck at an empty bottle, drawing air into its stomach to cause colic later.

Wet-nursing.—If for any reason the mother cannot nurse her baby and it cannot digest artificial mixtures, recourse must be had to a wet-nurse. The woman must be in good health and cleanly in her person and her habits. Syphilis must be excluded by the Wassermann test. In fairness to her the Wassermann test should also be made on the child, so that she is not unwittingly exposed to infection from it.

BIRTH INJURIES.

The distortion of the head and the marked caput which are seen in cases of exaggerated head-moulding can hardly be classed among injuries. Nevertheless the appearance of the child is rather disquieting to anyone who is not familiar with the condition, and the nurse may be called upon to reassure the family on the subject. It is really surprising to see how quickly the head resumes its natural shape.

The cephalhematoma is a swelling of the head which might be confused with the caput, except that it makes its appearance just when that would be subsiding. It is produced by the gradual oozing of blood under the pericranial membrane of one of the bones of the skull, usually a parietal bone. Since the hematoma is outside the skull, it cannot possibly cause pressure on the brain substance, and even when the swelling is large, it apparently gives the baby no discomfort. No treatment is required, as the clot will become absorbed in the course of a few weeks. The nurse has only to remember to lay the child in its crib in such a way as to avoid any irritation of the surface.

Cuts and abrasions from the forceps usually require only a protective dressing, but the physician may prescribe an antiseptic or some ointment. Bruises will disappear in due time without treatment; sometimes the purplish discolora-

tion resembles that of a birth-mark, but time clears up the diagnosis. Swelling about the eye is relieved by cold or hot compresses. If the eye itself is irritated, it should be

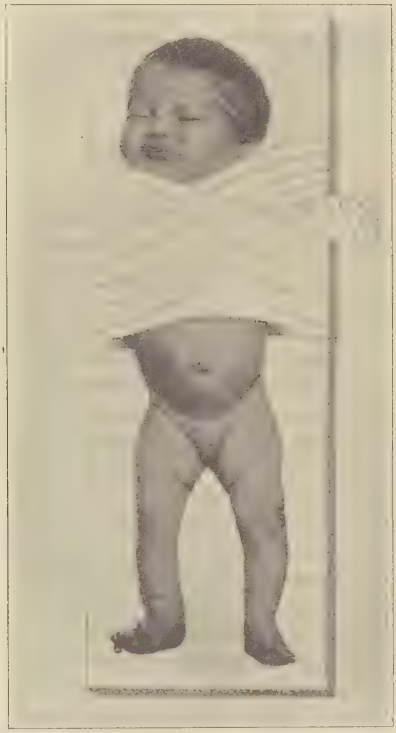

FIG. 106.—Fracture of both clavicles; mode of dressing; recovery. (Carr.)

flushed with boric acid or salt solution. The edema of the face which results from face presentations usually subsides without treatment. Members of the family are likely to feel considerable anxiety as to the outcome of all such

injuries; fortunately we are usually justified in assuring them that all marks will disappear.

A fracture of the humerus, femur or clavicle may occur in the course of a difficult delivery, more often in a version or a breech extraction. Prompt treatment almost always results in good union of the bone. The application of splints is sometimes difficult because the parts are so small, and the dressing may have to be modified accordingly. For example, one of the most satisfactory dressings for a broken collar-bone is arranged with a T-shaped splint at the child's back, held in place by a double figure-of-eight bandage over the shoulder. Remembering how easily the baby's skin is irritated, the nurse will take special care in padding the splints and protecting the parts from pressure with plenty of cotton and gauze. If the fracture is in the thigh, she is faced by the problem how to prevent the bandages from becoming soiled, and in spite of all her efforts it will probably be necessary to change the dressing rather often. Fractures of the skull are so rarely seen in these days of improved obstetrical technic that they need only passing mention.

BIRTH PARALYSES.

The pressure of the forceps in a difficult delivery occasionally causes paralysis of one side of the child's face. In a marked case the mouth is drawn down at one corner and the eye on that side cannot be closed. The distortion may not be noticeable when the baby is asleep, but is conspicuous enough when it cries. Fortunately the paralysis usually clears up in the course of a few weeks. No treatment is necessary, but massage may have some effect in hastening the recovery. It also makes the mother feel that something is being done.

Birth paralysis of one or even both arms is another result

of difficult deliveries (usually breech extractions), which has become familiar to us through the well-known example of the ex-Kaiser. The affected arm hangs limp from the shoulder, although there is motion in the hand and at the elbow-joint. The position is characteristic. The whole arm is rotated forward until the palm of the hand turns outward.

FIG. 107.—Facial paralysis following forceps delivery. (Complete recovery in six weeks.)

It is believed that in many instances there is some injury or slight dislocation at the shoulder-joint. The milder cases improve with massage and passive motion, leaving a useful arm, but the more serious ones will require electrical treatment and probably an operation later on. The nurse should be on the lookout for this condition, as she has the best opportunity to notice it.

MALFORMATIONS AND MONSTROSITIES.

It is always a matter of grave concern to the parents to know whether the baby is "marked" in any way or has any sort of deformity, since it is not at all uncommon for such things to occur. While some of these malformations are the result of arrested development at a certain point and are connected with malnutrition of the fetus in the uterus, many cannot be explained and none can be prevented by any sort of prenatal treatment, as far as our present knowledge goes.

Among the commonest deformities are hare-lip and cleft palate, club-foot, umbilical hernia, imperforate anus and spina bifida. A very minor deformity, which is often encountered and which, fortunately, can be easily remedied, is tongue-tie. The treatment of these conditions is largely surgical, but unless urgently needed, operations are usually postponed until the child is older and stronger—in other words, after it has passed beyond the care of the obstetrical nurse. In the case of imperforate anus immediate operation is, of course, necessary, as the child will die without it.

Hare-lip and cleft palate are of moment because they prevent the baby from sucking effectively and so interfere with nursing. It may be necessary to contrive a nipple with a rubber flap to fit over the roof of the mouth, or even to feed the child with a dropper. Because tongue-tie has a similar effect, although to a lesser degree, the nurse should always inspect the tongue carefully and report to the doctor if it is held down by the frenum. The condition is relieved by making a nick in the frenum with sharp-pointed scissors and tearing it gently down with the finger-tip, to avoid injuring a vessel. If oozing from under the tongue follows, it should be reported at once.

Minor degrees of club-foot are treated by massage and

manipulation in the simplest cases, or by correcting the deformity and holding the foot in place with adhesive strapping or a plaster bandage. Cases which do not respond to this treatment will be operated on later. It is interesting to note that club-foot is sometimes due to pressure on the feet while the child is in the uterus, if the amniotic fluid is scanty.

FIG. 108.—The first application of the plaster bandage, showing the improved position. (Whitman.)

Umbilical hernia is often cured by strapping with a wide band of adhesive plaster. This must not be done until the cord has dropped and the umbilicus is well healed and dry. Spina bifida, the protrusion of a sac of spinal fluid through

a defect in the spinal column, is often fatal, even with operation. The great danger is from infection or rupture

FIG. 109.—The adhesive-plaster support as used after correction of the deformity. (Whitman.)

FIG. 110.—Spina bifida.

of the sac, and the nurse's treatment is to keep the parts protected with sterile gauze.

Monstrosities range technically from the slight anomaly of

supernumerary fingers or toes to the various double monsters and joined twins. The supernumerary digits can be easily removed in most cases, as often there is no bony connection. The commonest monsters are anencephalus and hydrocephalus. The former has no skull and no brain except occasionally a small tuft protruding through the defect in the top of the head. Since the face makes up the main part of the head, it is often the presenting part. The delivery is

FIG. 111.—Monstrosity with encephalocele (protrusion of brain).

usually easy. In a case of hydrocephalus it is quite the reverse, since the head is so distended with the fluid that it cannot pass through the pelvis without injury to the mother. Rupture of the uterus has occurred as a result. The treatment is craniotomy, after which the head collapses and can be extracted. Double monsters are extremely rare; they naturally present special difficulties according to their size and the extent of the malformation.

On no account should the mother be allowed to see a

monstrosity or a mutilated child, and even the knowledge of its condition should be kept from her as far as possible. If she persists in asking questions about it, the nurse must refer her to the doctor in charge.

ATELECTASIS.

By atelectasis is meant inability to expand the lungs. The condition is noticed at birth in babies who are weak, premature or deeply asphyxiated. Even after the child is resuscitated, its breathing is shallow and labored and it keeps up a continual whining cry with each respiration. Atelectasis is also caused by the consolidation of lungs which occurs in pneumonia alba, the result of syphilitic lesions in the lungs of the fetus. Oxygen, artificial respiration, external heat and stimulation make up the treatment. Often, however, all measures are in vain, the child grows cold and cyanotic and finally dies.

JAUNDICE. ICTERUS NEONATORUM.

Jaundice in the newborn is due to various causes, such as changes in the blood, conditions in the liver and infections. One type is so commonly seen that it is often called physiological; it does the child little harm and can be counted on to pass away in a few days. A small dose of calomel and castor oil may hasten its departure. If accompanied by fever, the jaundice is probably part of an infective process and the prognosis is not always good. Some cases are hopeless from the start.

DIGESTIVE DISTURBANCES.

A healthy infant should not be troubled with indigestion. The causes of digestive disturbances lie largely in the methods

of feeding. The heartiest and strongest of babies will soon have its digestion upset, if fed too often or irregularly, whenever it cries. If it is allowed to take too much at a feeding, regurgitation is the natural result. It is not always recognized that the child may have indigestion if it is not kept warm enough.

Indigestion shows itself in a train of familiar symptoms, chief among which are colic, diarrhea and vomiting. The stools are green and undigested, with curds scattered through them.

Prevention is the important thing in this condition, but it often takes all the tact and firmness that the nurse possesses to establish a proper regimen for the baby in the face of time-honored family tradition. Once the disturbance is under way, more than regularity of nursing is required to stop it. The digestive tract may need to be well cleared out by an enema or colon lavage or a dose of castor oil. In some cases the chief requisite is rest for the stomach, which is secured by stopping the feeding for a while and giving only water.

Colic.—Colic is one of the commonest of the ills besetting young infants, and deserves a little space to itself. Like other digestive disturbances it usually is due to a faulty habit of nursing. Many babies have indigestion as a result of swallowing air in nursing too fast, and cold milk and sucking on an empty bottle are responsible for many a digestive upset in bottle-fed babies. It should not be taken for granted that every child who cries is suffering from colic. Babies cry because they are wet, cold or hungry, or because they are uncomfortable in some way. The cry due to pain can often be distinguished from that in other conditions, and a child with colic has a characteristic way of drawing up its legs during the attack. Not uncommonly the gas can be heard rolling about in its abdomen.

In a mild case it may be enough to lift the baby and let the gas escape. A hot-water bag placed against the abdomen often relieves the pain. An enema or a colon irrigation, by emptying the lower bowel, gives opportunity for the gas to pass out. Peppermint water and anise water are favorite remedies. Plain hot water will sometimes do as well. Paregoric and the soothing syrups which contain it are absolutely prohibited. The nurse must resolutely set her face against the various concoctions which are urged upon her by the family and interested friends. It is a wise plan for her to get from the physician a few directions as to his treatment for such cases.

HEMORRHAGIC DISEASE OF THE NEWBORN.

As the name suggests, this is a disease of the newborn, characterized by bleeding. Its cause is unknown. Syphilis is sometimes blamed for it, but is seldom a factor.

In many cases the trouble begins with continuous oozing from the umbilicus; hemorrhages from the mucous membrane of the gastro-intestinal tract are also common. In other cases the slightest abrasion is followed by a steady trickle of blood and hemorrhagic areas may appear even under the unbroken skin. The disease occurs most often within the first week of life and progresses rapidly to a cure or a fatal ending. The mortality is extremely high.

The nurse should always be on the watch for any signs of this disease, since in early treatment lies often the only hope of cure. The blood in intestinal hemorrhage may be bright red and profuse, but is often so dark by the time it is passed that the stools are black and tarry in appearance. This form of the disease is called melena neonatorum.

Various remedies have been suggested for this condition,

but few have met with success. The best results are obtained by the use of blood serum or fresh human blood injected hypodermically. Transfusion has saved many apparently hopeless cases.

MASTITIS.

The breasts of a young infant not infrequently become filled with a watery secretion which is familiarly known as "witches' milk." This is apt to appear during the first week. The breasts are slightly swollen and hard, but if they are left alone, the secretion gradually subsides without giving any trouble. Unfortunately the members of the family are sometimes obsessed with the idea that the milk must be squeezed out, and their efforts may be rewarded by the development of inflammation or even an abscess. The nurse must be firm in preventing any handling of the breasts. If there is much swelling, hot or cold compresses may be used; if actual suppuration, the physician will make an incision to let out the pus.

CONGENITAL SYPHILIS.

In the discussion of syphilis as a complication of pregnancy it has already been mentioned that the disease is likely to be transmitted to the unborn child. Even though the infection is not virulent enough to kill the fetus, the disease is almost sure to develop sooner or later. Its signs may be present at birth, but more characteristic is the case in which the child is born apparently strong and healthy, only to droop and lose ground unaccountably, until at last the diagnosis is cleared up by the appearance of more distinctive syphilitic lesions. In more than one-half the cases the symptoms begin to show themselves from the second to

the fifth week of life. According to Jonathan Hutchinson, the great English authority, one should always suspect syphilis when the history reveals that the child at birth was "as beautiful a baby as you need wish to see, but began to fall off when a month old."

FIG. 112.—Congenital syphilis. Bullæ on soles of feet. (Cragin.)

The outstanding symptoms are coryza, skin lesions and wasting. Swelling of the epiphyses, enlargement of the liver and hemorrhages are also characteristic of syphilis.

Coryza or "snuffles" is usually the first to appear. The nasal discharge may be so irritating as to cause the formation of crusts in and about the nose.

Typical of syphilis is the dry skin, with cracks and fissures

in the creases, and especially at the corners of the mouth and about the anus. A rash may appear and also little blisters or bullæ on the palms and soles. The buttocks become red and sore, and small ulcers develop, in spite of the greatest care.

The wasting is in great part due to the syphilitic infant's defective digestive powers and may progress rapidly. The child becomes fretful and emaciated and the skin hangs in folds, giving it the appearance of a little wizened old man. The pale grayish-yellow color of the skin is also characteristic.

Treatment.—The time to treat congenital syphilis is before the child is born. Medication given to the mother during pregnancy will act upon the fetus, which may thus escape the disease entirely. Nevertheless it is always safe to give additional treatment to the child of a syphilitic mother. Mercury in some form is the most satisfactory drug; if given by mouth, gray powder, in doses of $\frac{1}{4}$ to $\frac{1}{2}$ gr., and calomel, $\frac{1}{10}$ gr., are the most popular; it is also administered by inunctions of mercurial ointment, well diluted with lanolin or vaseline. If the mother is having injections of arsphenamine the child may receive some benefit from the treatment through the milk; the drug is seldom administered to newborn infants, although it will be of great value as the child grows older. A syphilitic baby should always be isolated, if in a hospital where there is danger of the disease being passed on to other infants in the nursery. In any case the nurse should exercise the greatest care to prevent any possible spread of infection; she should remember to disinfect her hands after handling the child and to see that all its clothing is disinfected before being sent to the wash. The dangers of wet-nursing should never be forgotten in this connection.

CARE OF THE PREMATURE INFANT.

A premature infant comes into the world handicapped, not only because it is small and weak but because it is undeveloped. It cannot keep the body temperature up to normal in the cold outside world, nor can it digest easily the food needed to give it strength. Every muscular exertion means using up energy which it can ill afford to lose.

The principles of the care required in such a case are therefor to keep the child warm and quiet and supply nourishment which it can assimilate.

The incubator is generally looked upon as the only contrivance by which a premature baby can be kept alive. It undoubtedly does secure an atmosphere of constant high temperature, but so many models sacrifice the freshness of the air in the process that some of our best hospitals have practically discarded them. The ideal arrangement which modern hospitals are adopting is the "incubator room," which provides both heat and ventilation.

Nevertheless, premature infants can be saved with much simpler equipment and a deep basket lined and padded with cotton and warmed by hot-water bottles makes an excellent substitute for an incubator. One of the bottles should be hung near the head of the crib so as to warm the air which the child is breathing. The basket should be kept in the warmest corner of the room, away from all draughts. The bed-clothes must not be made too heavy in the attempt to keep the baby warm. Besides the blankets which are tucked in, one should be hung over the lower part of the crib, adding a little warmth and protection without weight.

The baby must not be handled more than is absolutely necessary. It should go without saying that showing off the child to curious visitors is prohibited. Indeed, the baby

should not even be taken to its mother to nurse for some days, if it is very weak. The usual bath is omitted and a rub with warm oil substituted.

Feeding is a difficult proposition. It must be begun before the mother's milk has come in, as the child cannot stand the loss of weight which is normal for the newborn in the first days of life. In a hospital, mother's milk can sometimes be obtained from another patient in the interval, but if this is not possible, the doctor may order a very weak formula.

Fig. 113.—Premature baby in its crib (lifted to show cotton wrapped about head.)

Not all premature infants can use a nursing-bottle, and feeding by a medicine dropper, a Breck feeder or even by means of gavage may be necessary. Small quantities of milk, given slowly, bring about the best results. The baby may not be able to take more than one or two teaspoonfuls at first. The intervals between feedings should be short, not more than an hour or an hour and a half. Whether the milk used is pumped from the mother's breast or made up by a formula, special care is required to keep it sterile, as these babies are extremely susceptible to infection.

It is the custom to wrap a premature infant in cotton wool, but lambs' wool is preferable. As clothing, a sleeveless woollen slip or bag is the most practical garment, and a flannel hood should be added as a covering for the head.

THE NURSERY IN THE HOME.

Whenever possible, a room should be devoted to the baby. The ideal nursery should be bright and sunny, opening on a balcony which can be used for a sleeping-porch as the child grows older; it should have an open fire-place, since this not only adds to the cheer and comfort of the place but also can be relied upon to keep the room at an even temperature on the chilly days between seasons and to give extra warmth during the baby's bath. The nursery must be warm, 70° to 75° F., during the first weeks, since the child has been used to a temperature of 98° to 99° during intra-uterine life, and will require a little time to grow accustomed to the ordinary temperature of even our overheated houses. The room must be well ventilated, as fresh air is more essential for babies than many people realize. The usual practice of opening the windows at intervals while the room is empty, is well enough in its way, but it may cool down the temperature too much. A ventilator in the window is better in cold weather. A newborn infant should not be left so near an open window that the cold air will blow on it. The role of fresh air later on is outside the province of a book on obstetrical care.

The baby must sleep alone. This is an imperative rule which allows of no exception. Its importance is attested by too many cases of death of the child from overlying by the mother. If a crib is not available, a basket makes an excellent substitute. Even in the poorest home a clothes-

basket of some sort can be provided. A pillow protected with rubber sheeting or oil-cloth will serve as a mattress. The basket is carefully padded so that the baby will run no risk of hurting itself against the rough sides, and is warmed by hot-water bottles for the first day or two—longer if the room is cold or if the baby runs a persistent subnormal temperature. The most practical crib is one large enough to be used for the first two years of the child's life; a bassinet is charmingly attractive but is soon outgrown. The crib must be light and on castors or small wheels, so that it can be easily moved about the room. The sides should be high, to prevent the baby from falling out and the bars close together or so protected that it cannot injure itself by pushing arms or head through between them. The blankets should be warm but light; a heavy weight of bed-clothes is exhausting to the baby. The pillow, if used at all, should be small and soft.

THE HOSPITAL NURSERY.

A properly organized and well-equipped nursery is essential to the well-being of the newborn child. The room must be large, for a young infant is even more sensitive to overcrowding than an older child. Like the nursery in the home, it must be well ventilated without being draughty; ventilators should, therefore, be used in preference to the open window. Sunshine is indispensable, but the babies' eyes must be protected from the glare. The artificial lighting should be electrical and the switches so arranged that different parts of the room can be lighted separately. The indirect system of lighting is to be preferred. The ideal open fire-place is not practical for heating a hospital nursery, and the usual steam or hot water radiator is the best that

we can do until heating by electricity becomes less expensive. The room is most evenly heated when the radiator is at the center. As has already been stated, a nursery must be kept at an even warm temperature. A thermometer is an absolutely necessary part of the equipment. It is futile to try to gauge the temperature by the feelings of those who are working in the room.

FIG. 114.—Single crib in its carrier.

The cribs are of white-enamelled iron, with handles by which they can be easily lifted. They are arranged to hang on rolling carriers, which can be wheeled from the nursery to the ward at feeding-time, so that the nurse will not have to carry the babies back and forth in her arms. The cribs are lined with quilted padding, which is tied on with tapes so that it can be easily changed and washed. The mattresses

are protected by rubber sheeting and covered with small sheets. A square of padding is provided to be placed under each baby. There should be an abundant supply of these pads, so that they can be changed whenever soiled or wet. The crib blankets must be of a quality to withstand repeated washing. They should be large enough to tuck under the mattress. As a general rule, a baby should not be wrapped in a blanket when put in its crib. The attractive appearance of the nursery as a whole is enhanced by the addition of a thin white spread to each crib.

FIG. 115.—Cribs on rolling carriers.

The bath-room should be separate from the nursery, but adjoining it. The common bath-tub has no place in the modern nursery, as it is impracticable and almost impossible to sterilize it between baths. The ideal arrangement is to wash the baby under running water on a specially devised slab. The drying and dressing of the child are then done on an electrically heated table. All articles which may be required are arranged beforehand, so as to be within the nurse's reach. The baby must never be left alone when it

is lying on the table, lest it unexpectedly roll to the edge and fall off.

The babies are weighed in the bath-room, either before or after the bath, as may be preferred, but at the same time each day. The scales should be of the even-balance type; the spring-balance scales are less accurate. As many hospital nurseries use the metric system of weights, the nurse must familiarize herself with this method; she must also be able to make rapid translations into pounds and ounces for

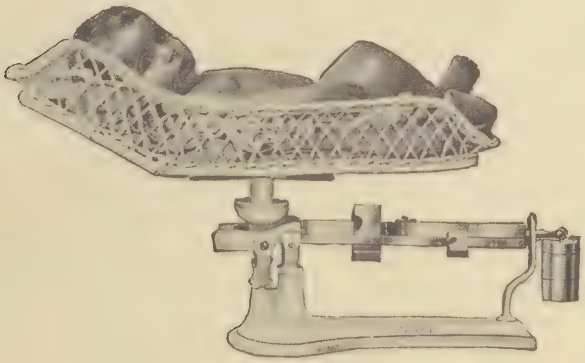

FIG. 116.—Scales, with basket.

the benefit of the family and friends. The scale-pan is covered with a clean diaper before the baby is laid in it. Too often in a hospital nursery this diaper is not changed for the succeeding babies.

In a hospital some means of identifying the babies is a necessity. Various methods have been suggested, even to strings of beads, but none is as yet thoroughly satisfactory. Probably the most commonly used identification mark is a piece of adhesive plaster on which is written the child's name; this is pasted on the infant's back or chest or around its

wrist. The nurse should not fail to examine this after the child's bath to be sure that it is still in place and that the name has not become blurred and illegible. The fear that babies will be mixed in the nursery haunts many mothers and actually deters them from entering a maternity.

An unromantic, but very necessary part of the nursery equipment, is a covered pail partly filled with an antiseptic solution, into which the diapers are dropped to be disinfected as soon as they are taken off. Napkins which have been washed should never be hung in the nursery to dry.

The nurse must never forget that the danger of cross-infection lurks in every nursery unless the most scrupulous care is taken to keep each baby and its belongings separate from the rest. Individual wash-cloths should be provided for the bath, or better still, cotton balls which can be thrown away after using. It is against every rule of hygiene to wash all the babies with the same cake of soap, and since it is not practicable to keep an individual cake for each one, soap flakes or liquid soap will answer the purpose. The mixing of blankets, clothing and diapers is inexcusable in a well-run nursery. When contagion spreads in a nursery, someone's carelessness is to blame.

In general, it may be said that the best results in a hospital nursery are obtained by the nurse who considers each baby as an individual, knowing its special needs and caring for it accordingly.

APPENDIX.

Outfit for Patient

2 agate or enameled basins.
2 large pitchers.
2 hot-water bags.
1 ice-cap.
1 two-quart fountain syringe.
1 bed-pan.
1 bath thermometer.
2 hand-brushes.
2 medicine droppers.
1 tube of vaseline or K-Y jelly.
1 tube of green soap or 4 ounces liquid soap.
25 tablets bichloride of mercury.
3 ounces liquor cresol comp., lysol or similar preparation.
8 ounces alcohol (if obtainable).
8 ounces boric acid solution.
1 ounce fluid extract of ergot.
1 can of ether.
3 ounces olive oil.
1 sterile cord dressing and tape.
2 pieces rubber sheeting or oil-cloth (1 x 2 and 1 x 1 yds.).
5 yards unbleached muslin.
3 quilted bed-pads.
3–4 dozen sterilized vulvar pads.

25 yards gauze.
2 pounds absorbent cotton } for making pads, etc.

(If the vulvar pads are bought ready-sterilized, half this amount of gauze and cotton will suffice.)

Outfit for Nurse

Hand-brush and nail file.
Soap.
Soft rubber catheter.
Scissors.
Cord clamp.
Sterile cord tape and dressing.
2 pairs rubber gloves.
2 hypodermic syringes, with at least 4 needles.
2 thermometers.
1 dressing-forceps.
1 bottle bichloride tablets.
3 ounces lysol or similar preparation.
2 medicine droppers.
2 gowns.

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